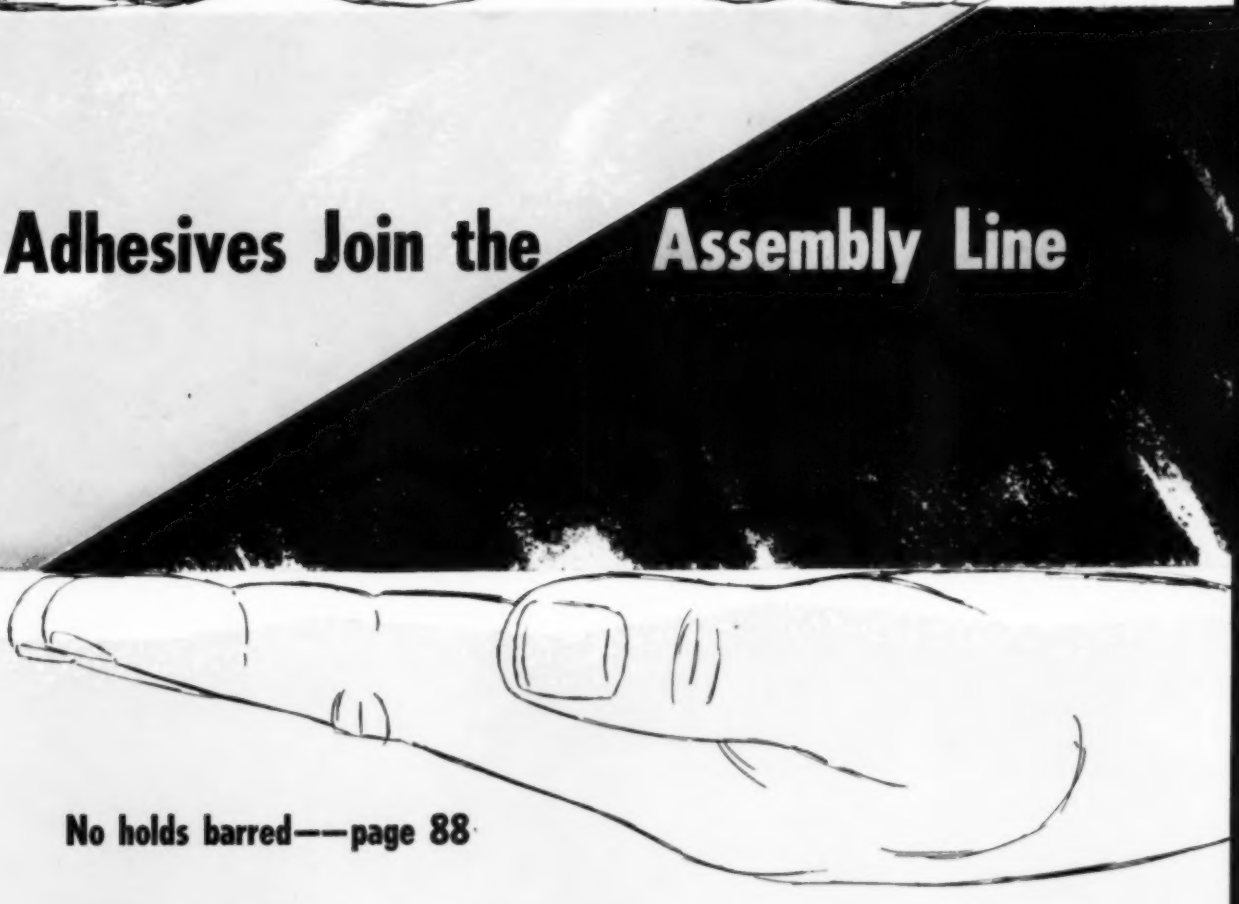
July 26, 1954

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Adhesives Join the Assembly Line



No holds barred—page 88

✓ **EQUIPMENT MARKETING**
Leasing Catches on, p. 45

✓ **WATCH THE CARBIDES**
They Can Take the Stainless out of Steel, p. 92

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consider:

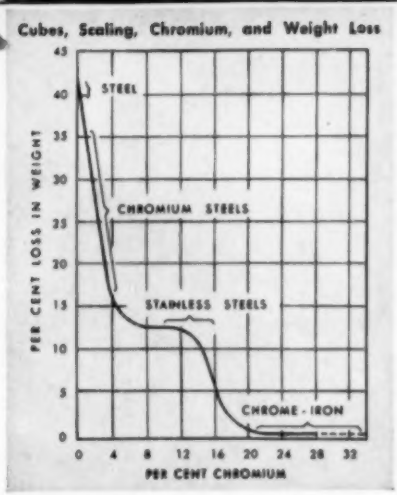
Oxidation Resistance and Analyses

The loss of metal, through scaling, at high temperatures is a costly phenomenon that must be considered in the selection of stainless tubing where conditions of extended excessive temperatures are present.

When choosing a specific Croloy for your operation it is well to review the factors that govern the service life of the tube. For example, B&W Croloy 18-8S (AISI Type 304) can operate, without excessive scaling, at a maximum temperature of 1650 F. Here, as in most other cases, the temperature limit may have to be revised downward should combustion products or gases high in sulphur compounds or vanadium-containing ash be present.

This is but one general example of the intricacies involved in choosing the proper stainless tubing for a specific use. For virtually any application B&W can provide either seamless or welded stainless tubing in any number of grades, in a broad size range. Help in obtaining the best stainless tubing —pressure or mechanical—for your applications is available through B&W Regional Sales Offices and a nationwide network of experienced tubing distributors. Mr. Tubes—your link to B&W—will be pleased to furnish detailed answers to your stainless tubing problems.

TA-4058(SSM)



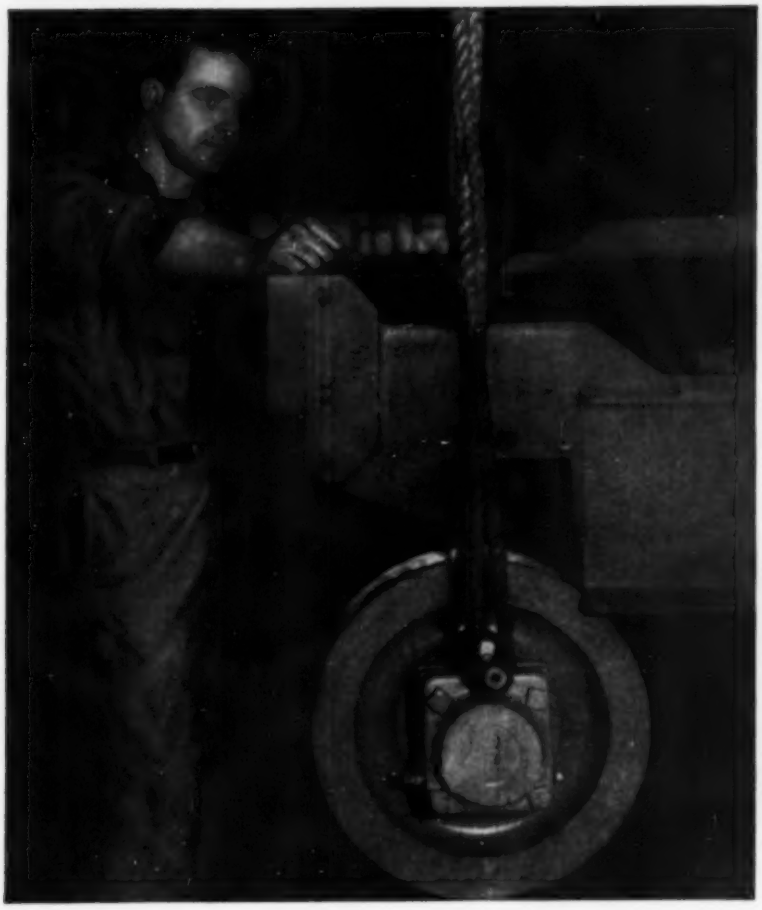
Many tests have been made under different temperatures with steels having various chromium content to determine their resistance to oxidation. Chart above clearly explains what happens — oxidationwise —to metals when exposed to a temperature of 1835 F for 48 hours.

B&W STAINLESS and WELDED TUBES

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION

Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

The Blanks with Extra Strength... yet not a pound of surplus weight



▲ Easy to machine, forged-and-rolled blanks are ideal for the making of sheave wheels.

◀ Crane-track wheels are made from Bethlehem forged-and-rolled blanks by Shepard Niles Crane & Hoist Corporation, Montour Falls, N. Y. The customer cites the longer life of these wheels, and their strength and shock-resistance — qualities valuable in the heavy-duty machines built by the company.

▲ Another common end use: gears.

On this page are shown several uses of Bethlehem forged-and-rolled circular blanks. All these applications require high strength. Yet in each case it is desirable to eliminate needless weight. That's why Bethlehem blanks are the logical choice, for they *do* have high strength without so much as a pound of surplus weight.

Reason: the blanks are made by a process that combines the steps of forging and rolling in a single operation, thereby assuring the density of forged metal and the good grain flow and structure of a rolled product. Result: unusual stress-resistance. Because of this characteristic, customers have frequently found it possible to use thinner sections than they formerly specified.

End products made from these blanks include spur, bevel, and herringbone gears, crane-track wheels, sheave wheels, clutch drums, flywheels, turbine rotors, tire molds, and similar parts. The blanks are available in a wide choice of sections, and they can be furnished untreated or heat-treated, as you prefer. Sizes range from 10 to 42 in. OD.

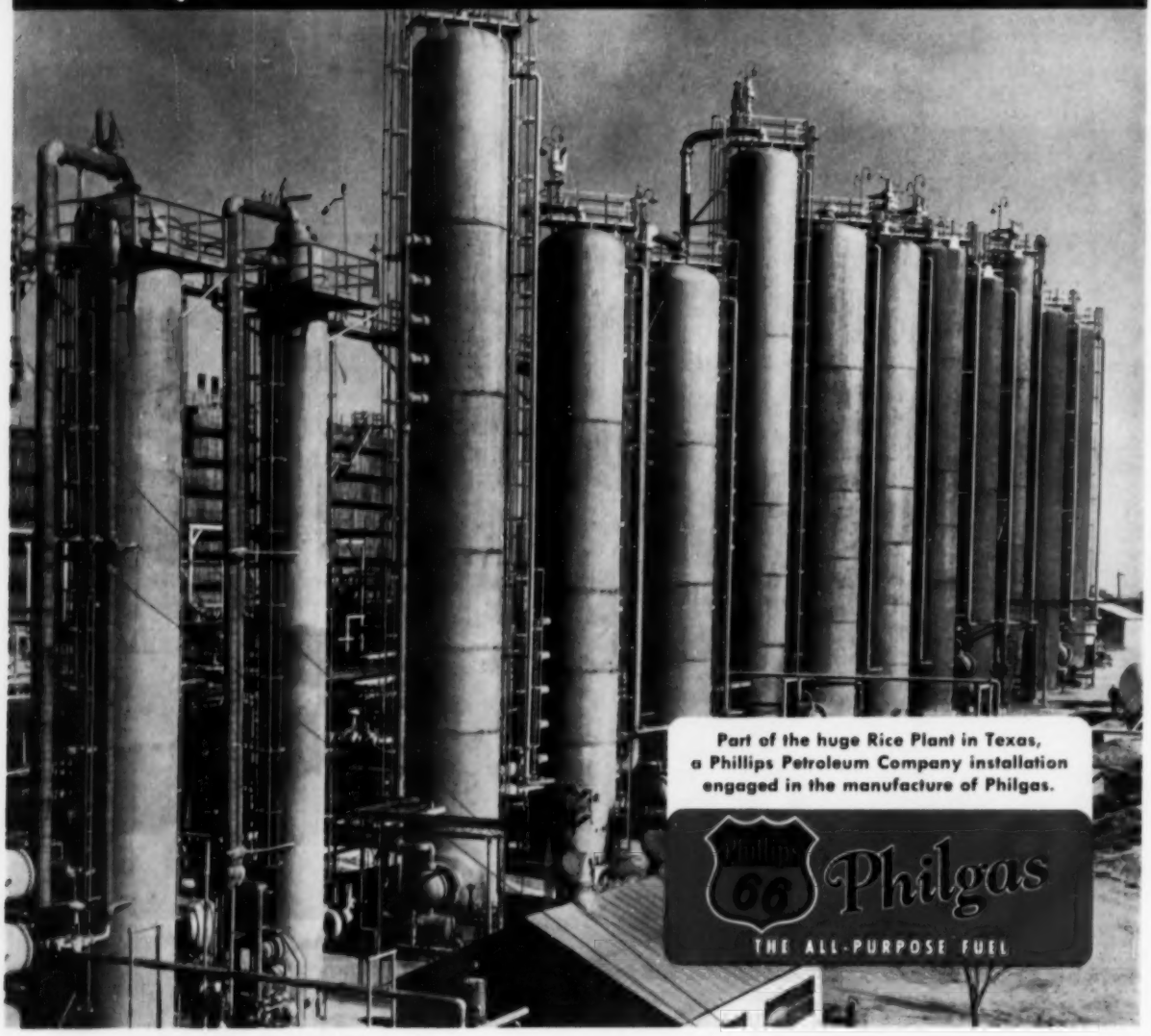
Why not investigate? It could be the first step toward a stronger product . . . and important shop economies we'll be glad to tell you about.

BETHLEHEM
Forged-and-Rolled
CIRCULAR FORGINGS

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

*Philgas** IS AMERICA'S LARGEST SELLING LP-GAS



Part of the huge Rice Plant in Texas, a Phillips Petroleum Company installation engaged in the manufacture of Philgas.

PHILLIPS MODERN MANUFACTURING AND STORAGE FACILITIES ASSURE YOU A HIGH QUALITY PRODUCT.

● Phillips modern facilities and strict standards of production are your assurance of the purity, uniformity and high thermal value of Philgas. Phillips vast storage capacity helps assure you of dependable, year-around supply. Phillips also maintains its own fleet of tank cars and trucks to provide prompt deliveries.

Philgas is a clean-burning LP-Gas with uniform thermal values and gravity. It is free from harmful contaminants. With Philgas you can have automatic systems with constant, easily controlled operations. Write for information. Find out why many leading industries are using Philgas to turn out better products and, at the same time, cut operating expenses.

*Philgas is the Phillips Petroleum Company trademark for its high quality propane-butane LP-Gas or bottled gas.

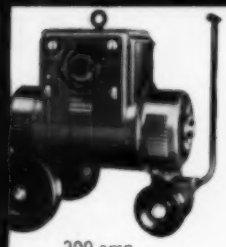
PHILLIPS PETROLEUM COMPANY

Sales Department • Bartlesville, Oklahoma

Offices located in Amarillo, Tex., Atlanta, Ga., Chicago, Ill., Denver, Colo., Des Moines, Ia., Indianapolis, Ind., Kansas City, Mo., Minneapolis, Minn., New York, N. Y., Omaha, Nebr., Raleigh, N. C., St. Louis, Mo., Tampa, Fla., Tulsa, Okla., Wichita, Kans.

MORE TOP QUALITY WELDING PER DAY

. . . for Plant Production and Maintenance



300 amp. Electric Portable

Bantam Champ

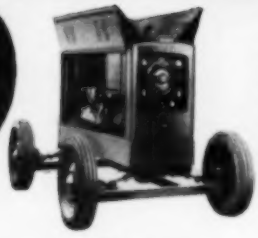
For Automatic Welding

AC Transformer Welders

ELECTRIC MOTOR DRIVEN. Production, maintenance and general shop welding can be done faster and better than you ever thought possible. Made for light work or heavy in 200-, 300-, 400- and 600-ampere sizes—either stationary or portable. As a source of current supply for automatic and semi-automatic welding, insures uniform welds of desired density.

Makes possible more man-hour, foot-hour or pound-hour production. Insures high quality metal deposit and weld strength with uniform penetration. Check coupon for complete details.

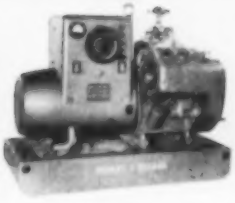
. . . for Construction, Building and Repair



300 amp. Gas Engine Drive

AC Welder AC Power Combination

250 amp. "Pipeliner"



200 amp. Air Cooled Gas Drive

GAS ENGINE DRIVEN Hobart offers a wide range of models and sizes to meet every welding requirement . . . available with air or water cooled engines.

Now you can have AC welding and AC power for jobs away from power lines or as emergency power for electric lights . . . to operate power tools, motors, etc. Use coupon for complete information without obligation.

HOBART BROTHERS CO., BOX ST-74, Troy, Ohio • Phone 21223

HOBART TROY OHIO WELDERS

"One of the world's largest builders of arc welders and welding equipment"

You'll like this HOBART No. 10 general purpose rod

For better welds right down to the stub, the Hobart (E-6010) gives better welding ease with a stable, deeply penetrating arc—deposits a smooth, flat bead of high tensile strength and ductility—gives a non-porous weld with quick, easy slag removal. Tell us the type work you are doing and we'll send samples.

HOBART BROTHERS COMPANY, BOX ST-74, TROY, OHIO

☐ **FREE** Welder's Vest Pocket Guide . . . a practical guide to better welding techniques.

Send information on the items checked below.

_____ amp. Capacity ☐ Portable ☐ Stationary ☐ Electric Motor Driven Welders ☐ Gas Engine Driven Welders ☐ Welders with auxiliary power ☐ Free Electrode Samples—state type work

☐ Other _____

NAME _____ POSITION _____

FIRM _____

ADDRESS _____

HOBART WELDERS, ELECTRODES

The operator brings the rotating lapping stone into contact with work centers to correct inaccuracies.

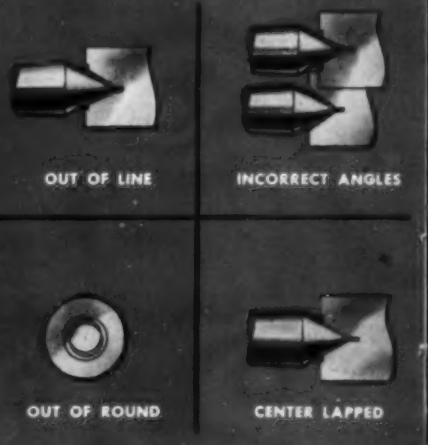
EX-CELL-O

CENTER LAPPING MACHINES

FOR GREATER PRECISION IN SUBSEQUENT MACHINING

Meeting today's precision standards requires careful checking of every phase of the job, *including the center holes in the work*. Ex-Cell-O Center Lapping Machines correct inaccuracies of center holes, thus contributing to greater precision in all subsequent operations performed between centers. These machines are precision built and are easy to operate. The lapping stone is dressed to a 60° angle by a hand operated diamond dresser. An adjustable dresser for other angles also is available. These machines are fully described in Bulletin 40271—a copy is yours for the asking.

Eliminate out-of-line, out-of-round, and incorrect angles by Center Lapping



EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

XLO
EX-CELL-O for PRECISION

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
DAIRY EQUIPMENT • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS

53-44

This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Vol. 135 No. 4 July 26, 1954

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Industrial diamonds don't look much like those in milady's necklace, but they do a smooth job for metalworking

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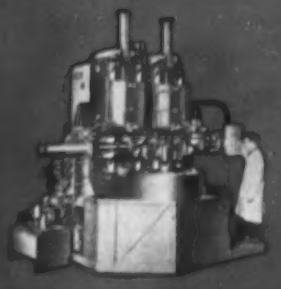
XLO
PRECISION BORING MACHINES
High production, cost-saving machines for fast, accurate boring, turning, facing, chamfering and grooving.

Standard Precision Boring Machines

Way-type Precision Boring Machines

Precision Cylinder Boring Machines



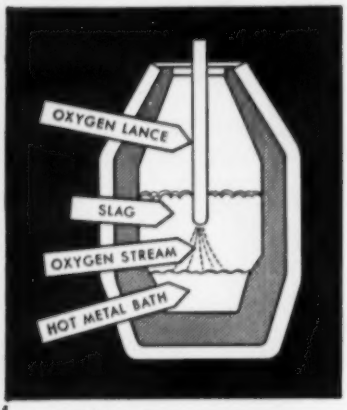
Vertical Precision Boring Machines

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

(Advertisement)

what's NEW in Engineering

To cut refining costs of steel, Kaiser Engineers has acquired the exclusive U. S. rights for the Brassert Oxygen Converter Process of producing high quality steel. Recognized as an advanced development



in steelmaking, the oxygen process promises a definite saving in refining costs of at least $3.00 per ton. Investment cost is also lower, as one 35-ton oxygen converter will produce as much as three 175-ton open hearth furnaces at half the estimated capital investment. Write us for a brochure describing the process in detail.

The largest construction contract in Australia's history has been awarded to the Kaiser-Walsh-Perini-Raymond group of American contractors. With Kaiser Engineers as the project's sponsor, the group will construct a dam and mammoth 14-mile water tunnel through the Snowy Mountains of Southeast Australia.

Asme Handbook Metals Properties. This is Volume I of a four volume handbook sponsored by The Metals Engineering Handbook Board of the American Society of Mechanical Engineers. Published by McGraw-Hill, METAL PROPERTIES tabulates strength, hardness and the other properties of over 500 metals.

Whatever your immediate research, design or engineering problems, however unusual they may be, an early consultation with Kaiser Engineers is an important step toward their quick, profitable solution. Call or write Kaiser Engineers Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.

behind the scenes

Another Winchell, Maybe?

Have you noted the new feature appearing in STEEL's technical section periodically? It's called "Machine Topics" and is written by Bob Huber, machine tool editor.

The column is one of those "just-between-you-and-me" type of deals where Bob drops tidbits that have been given to him a-la-Winchell . . . or maybe even Drew Pearson.

Suggest you check this tightly written number. There may be a few choice items here that you can use to good advantage by adapting them to your own specific needs.

Sorry, We Just Lost Our "O"

We lost an "O" in the "Progress in Steelmaking" story on page 120 in the July 12 issue.

We were going along as pretty as you please describing the steps in forging, rough-machining and heat treating a 23-ton hardened and tempered die holder being made by the Heppenstall Co. of Pittsburgh.

The description was fine, got through it beautifully. It was after the story was written and run that we found an extra "O" lying around. It didn't take us more than a minute or two to realized that we had goofed. A 23-ton die holder won't fit too neatly into a 1500-ton press. What we should have said, of course, is that "the die holders were delivered to the Cleveland plant of Aluminum Co. of America where they will be used in a 15,000-ton hydraulic press."

We're sorry.

A Novel Approach

We have been rather intrigued with the unusual advertising campaign being run currently by Luria Bros. & Company, Inc. We're talking about their series on the theme "Great Moments in the History of the Iron and Steel Industry."

The first ad we saw featured the contributions of Rene Antoine de Reamur who, in 1722, discovered a method for reducing metal from ore and carburizing it in one operation. Here was a giant step forward in the conversion of bar iron into steel.

The second advertisement in the series discusses Major Hanbury's development of pack rolling back in 1728.

The ad layouts include likenesses of the personalities as well as drawings of their processes as they were employed in those early days of steelmaking.

Congratulations to Luria Bros. for an educational and most interesting historical series.

Getting Bigger All the Time

Did you know that metalworking's "bigness' is contributed to by less than one-half of the approximately 55,000 plants in the industry?

More than one-half the plants employ less than 20 persons and account for only three per cent of the industry's output.

Get Your Reprints Here!

Last week's Program for Management article was the second of three being written by John Morgan, assistant managing editor, on the subject of distribution.

The first, as you remember, was "Integrate Your Distribution . . . and find a new industrial frontier in your own backyard." This appeared in the June 21 issue. The July 19 installment was titled "Personnel and Distribution."

The third installment will appear in August and will deal with the subject "Transportation in Distribution."

Interest in this trilogy and in the other "P for M" articles is high. If you are among those who need an extra copy or two of the distribution articles, or any of the others for that matter, just write for reprints of the ones you want. Address your requests to STEEL Readers' Service Department, 1213 West Third Street, Cleveland 13, Ohio. We'll be happy to send them along with our compliments.

Shrdlu

(Metalworking Outlook—Page 37)

Here's important news for strip producers, processors and welded pipe producers—

BLISS ACQUIRES ALL RIGHTS TO WELD-A-MATIC SPLICERS

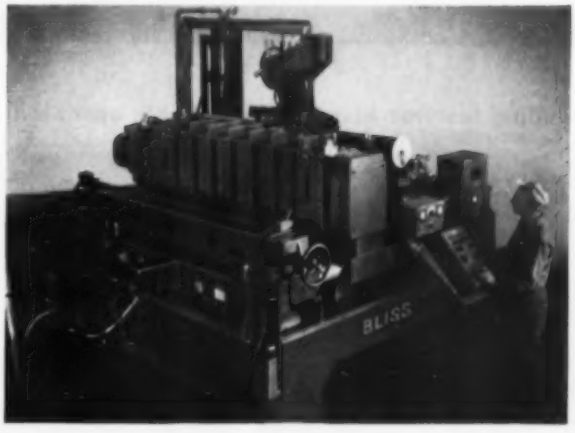
All rights to the Weld-A-Matic Splicer line used for ferrous and non-ferrous splicing have been acquired by E. W. Bliss Company from the dissolved Arms-Franklin Corporation. The agreement transfers to Bliss all patent rights, engineering drawings, service, operating and empirical data.

Weld-A-Matic Splicers are widely used for the splicing of strip for coil build-up, continuous feeding of skelp in light wall-pipe making, reuniting silicon sheets into continuous coils and many other uses.

Gages spliced range from 0.014 in. to 0.3125 in.; speeds up to 120 in. per minute depending upon gage. Weld-A-Matic Splicers are completely equipped and easy to operate, under the shielded-arc principle: no special welding skills required by operators.

E. W. Bliss is continuing research and development of the line. Though some grades of aluminum can now be welded, Bliss is seeking to widen the application. In addition, Bliss plans to manufacture two of the more popular models as standard—others will be designed to suit special requirements.

For more information, write or call for a Bliss engineer.



Remember: BLISS SINCE 1857 **for Presses, ROLLING MILLS, Special Machinery**

E. W. Bliss Company • General Office: Canton, Ohio

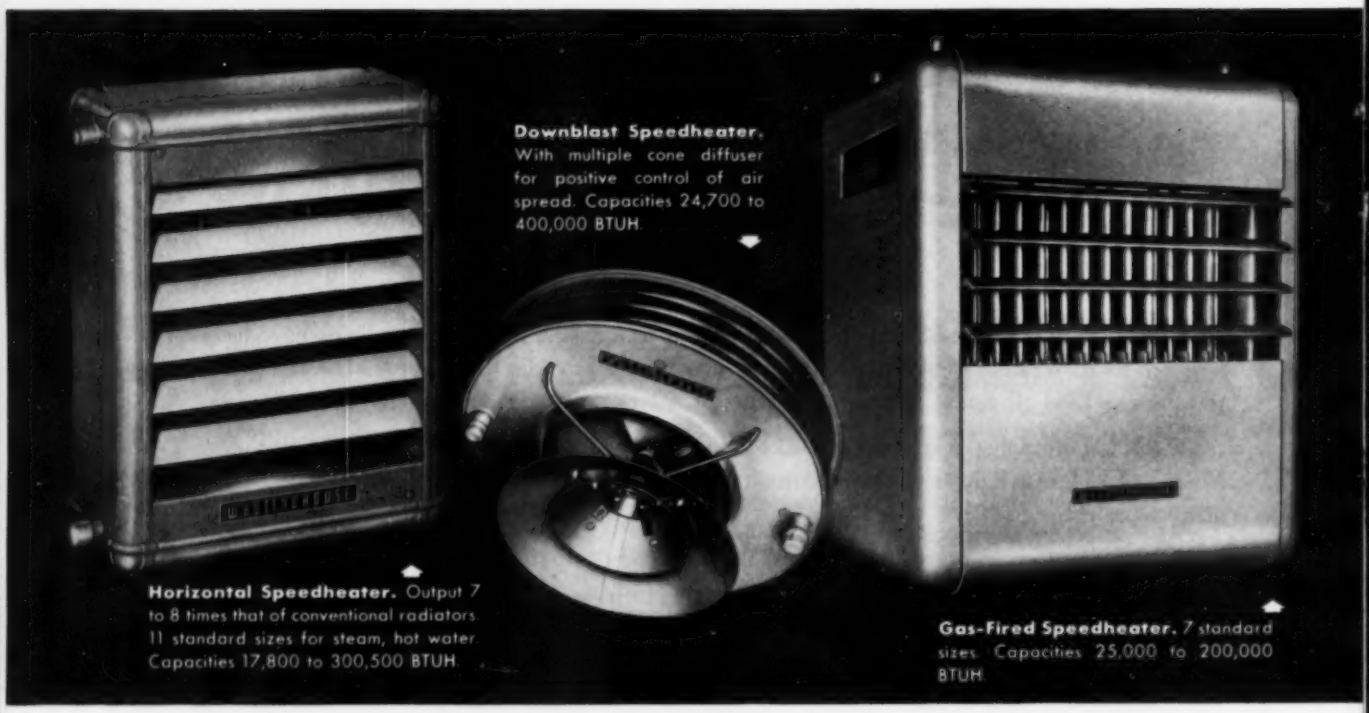
ROLLING MILL DIVISION: SALEM, OHIO

Subsidiary: The Bliss Supply Company, Cleveland, O. • E. W. Bliss (England) Ltd. • E. W. Bliss Company (Paris) France

U. S. Plants in Canton, Salem and Toledo, Ohio; Hastings, Michigan; and San Jose, Calif. Branch Offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo and Toronto, Canada. West Coast Representatives: Moore Machinery Co., Los Angeles and San Francisco; Star Machinery Company, Seattle. Other representatives throughout the world.

FLOW HEAT EVENLY OVER LARGE AREAS . . .

Westinghouse Speedheaters®



Downblast Speedheater. With multiple cone diffuser for positive control of air spread. Capacities 24,700 to 400,000 BTUH.

Horizontal Speedheater. Output 7 to 8 times that of conventional radiators. 11 standard sizes for steam, hot water. Capacities 17,800 to 300,500 BTUH.

Gas-Fired Speedheater. 7 standard sizes. Capacities 25,000 to 200,000 BTUH.

Outstanding features assure quiet, reliable operation . . . easy installation:

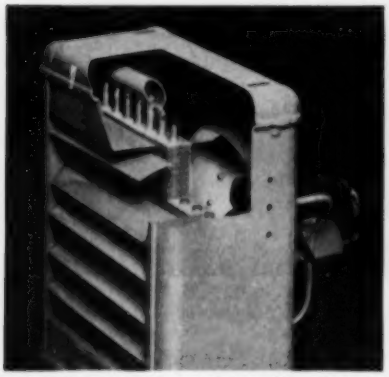
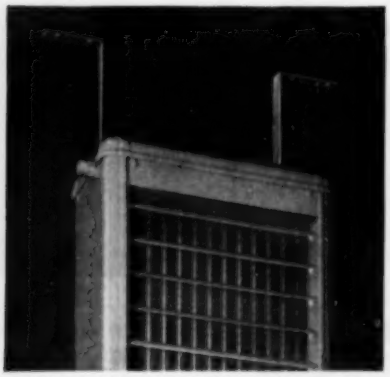
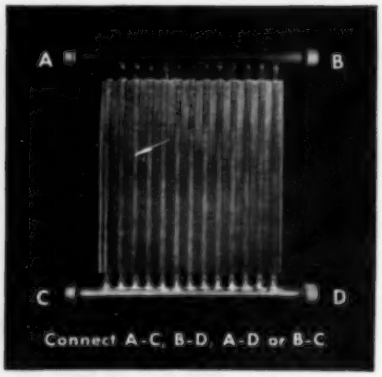


Plate fins cut noise, maintain uniform air flow, minimize clogging of coil with dirt and dust. Adjustable louvers spot or spread heat directly into work zone. Unit requires no warm-up — a flip of a switch generates *instant heat.*



Pliable steel hangers, a Westinghouse exclusive, simplify installation of Horizontal Speedheaters. Heavy-gauge welded steel casings, heavy seamless copper tubes, rugged motor and fan increase service life.



Four connection combinations further simplify installation of Westinghouse Horizontal Speedheaters . . . reduce piping costs . . . allow flexibility in installation to fit varied unit and piping locations.

Spread Instant Heat on Work Zones

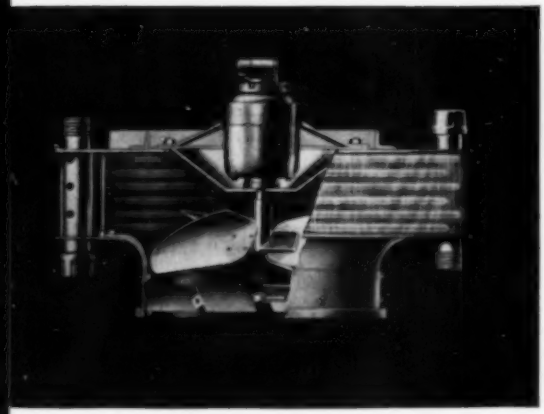
Modern-design Speedheaters slash fuel costs up to 25% when used as complete systems or supplements to existing central systems.

These three Westinghouse Speedheaters provide instant, low-cost heat—*where* and *when* you want it—for applications ranging from spotting heat into small areas, to spreading heat comfortably and efficiently over large work zones. Both dependable and attractive, they are ideal for stores, offices, factories, warehouses—anyplace, in fact, requiring quick, uniform heat at lowest cost.

Westinghouse Speedheaters go to work immediately. Their *instant heat* eliminates fuel loss . . . saves, as proved in installations across the country, up to 25 per cent in fuel costs over old-style heating systems. Available in sizes from 17,800 to 400,000 BTUH, these Speedheaters supplement your present central system for most effective heat coverage . . . or satisfy, through flexible unit selection and placement, your entire heating needs.

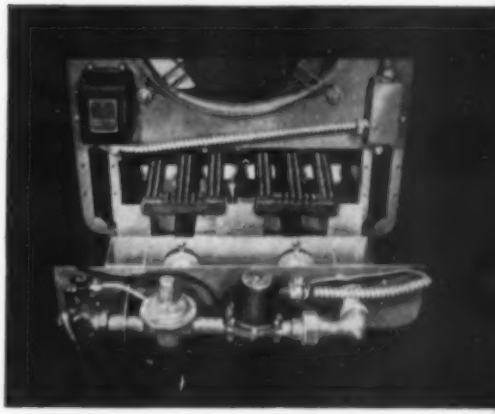
Check on these versatile units today. Call the Westinghouse-Sturtevant representative conveniently located in your area, or write Westinghouse Electric Corporation, Sturtevant Division, Boston 36, Mass.

For specifications, dimensions, performance data, send today for CATALOGS 1521 (Steam—Hot Water) and 1525 (Gas-Fired)



For buildings with high ceilings, Westinghouse Downblast Speedheaters are ideal. Powerful fans and directional vanes project heated air down to work levels, blanketing large areas with effective, economical heat even where equipment and partitions obstruct circulation

Fully automatic Gas-Fired Speedheaters eliminate need for central heating plants . . . run on low-cost natural, manufactured or LP gas. Units have seal of approval of AGA Testing Laboratories.



WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE...IF IT'S Westinghouse

save packing
TIME

utilize
SPACE

eliminate damaging
MOTION

HINDE & DAUCH

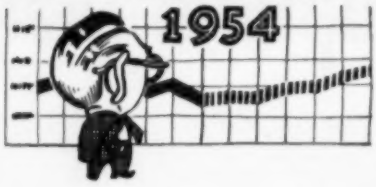
Authority on Packaging

12 FACTORIES • 40 SALES OFFICES

Write for booklet, "How to Ship More Economically in Corrugated Boxes." Hinde & Dauch, Sandusky 47, Ohio.

LETTERS
TO THE EDITORS

Midyear Report Notes Upturn



Your article, "Midyear Report" (June 28, p. 55) is very interesting, so much so that I would like to have 100 tear sheets of it to send to our salesmen and sales agents throughout the U. S.

I am glad indeed to note that you are quite optimistic as to the metal-working industry for the next half year, and I hope that you are correct.

J. B. Doan
chairman
American Tool Works Co.
Cincinnati

• *That optimistic note you mention was the consensus of hundreds of metal-working executives, which we have found in the past to be one of the truest business barometers. Tear sheets are sent.—ED.*

Please send 60 copies of the "Midyear Report" . . .

Herbert W. Haas
C-O-Two Fire Equipment Co.
Newark, N. J.

• *Sent.—ED.*

Distribution Proves Popular

Please send a reprint of your article, "Integrate Your Distribution" (June 21, p. 113), No. 5 in STEEL's 1954 Program for Management.

W. R. Caple
Magnesium Department
Dow Chemical Co.
Midland, Mich.

Please send me a reprint . . .

L. E. Hoskins
Ordnance Division
Food Machinery & Chemical Corp.
San Jose, Calif.

Please send to my attention a reprint of "Integrate Your Distribution" . . .

Robert H. Wendt
vice president & general manager
Kiekhaefer Aeromarine Motors Inc.
Fond Du Lac, Wis.

Please send two reprints . . .

L. T. Barry
manager industrial division
Electric Service Mfg. Co.
Philadelphia

Please send six reprints . . .

G. H. Edmonds
manager, warehouse distribution
Carpenter Steel Co.
Reading, Pa.

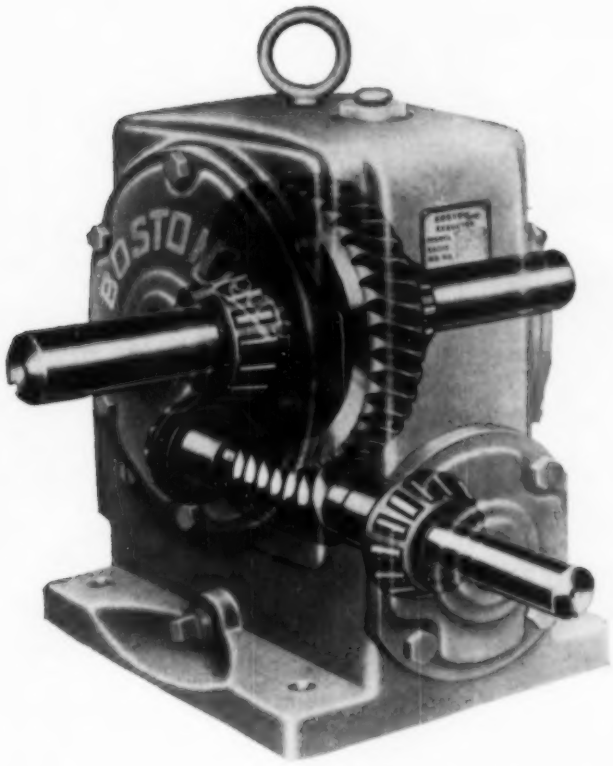
Please send to my attention one reprint . . .

G. P. Hitchings
Economic Analysis Department
Ford Motor Co.
Dearborn, Mich.

Please send a reprint . . .

Robert Jakes
Jakes Foundry Co.
Nashville, Tenn.

(Please turn to page 12)



How to make a worm gear stop spitting teeth

When a speed reducer transmits power to a machine, the output shaft takes a beating from the torque effect necessary to carry the load. If the steel can't take it, gear teeth wear excessively. Or they snap off.

Boston Gear Works had the problem with its Gear Reductor. Working with Republic's 3-D Metallurgical Service, they tortured gears and shafts made of many different steels.

Republic metallurgists recommended Cold Drawn 4140 Alloy Steel for the worm gear shaft for toughness and strength. For the worm and the worm shaft, which are integral, where hardness, machinability and smoothness were needed, 4615 Alloy Steel.

Result: A highly polished finish that assures proper meshing with the worm gear; a minimum of wear; a reductor that easily handles shock loads and 24-hour running conditions.

What about your problems? Perhaps the right alloy steels, recommended by Republic's 3-D Service, can mean better production rates. A better product. Or lower costs. Sometimes, all three. Phone your nearest Republic office for the facts. Or write to:

REPUBLIC STEEL CORPORATION
Alloy Steel Division · Massillon, Ohio
GENERAL OFFICES · CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

REPUBLIC ALLOY STEELS

REPUBLIC STEEL

Other Republic Products include Carbon and Alloy Steels — Titanium — Pipe, Sheets, Strip, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

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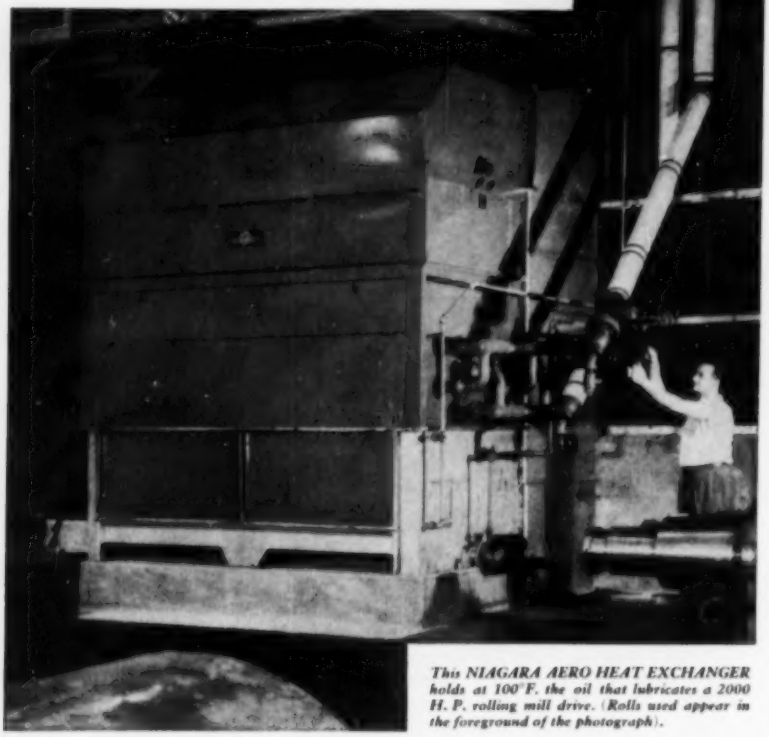


This NIAGARA AERO HEAT EXCHANGER holds at 100°F. the oil that lubricates a 2000 H. P. rolling mill drive. (Rolls used appear in the foreground of the photograph).

The Niagara Aero Heat Exchanger uses atmospheric air to cool liquids and gases by evaporative cooling, removing the heat at the rate of input, controlling temperatures precisely. You save 95% of the cost of cooling water. You get great saving in piping, pumping and power, quickly getting back the cost of the installation.

You can cool and hold accurately the temperature of all fluids, air and gases, water, oils, solutions, chemicals for processes and coolants for mechanical and electrical equipment. You can cool welding machines, hydraulic and extrusion presses, plastic molds, furnaces, controlled atmospheres, quench baths, obtaining better results with precise temperature. You obtain closed system cooling, free from dirt or scale.

For further information, write for Bulletin No. 120

NIAGARA BLOWER COMPANY

Dept. S , 405 Lexington Ave. New York 17, N. Y.

Niagara District Engineers in Principal Cities of United States and Canada

LETTERS

(Concluded from page 10)

We read with interest your article, "Integrate Your Distribution". Please send us five reprints . . .

M. E. Flegg
Ferro Metal Ltd.
Montreal, Que.

• *These requests and many others have been filled. The second in a series of three Program for Management articles on distribution appeared in the July 19 issue, p. 91.—ED.*

Thoughts on Automation

Your Apr. 12 issue has an excellent article entitled, "Automation: How Far Should You Go?" (p. 87).

We are in the automation program to some degree. We have made a transfer machine of considerable magnitude for a prominent typewriter manufacturer.

I think that all tool manufacturers are being besieged with all sorts of talk on automation. About 98 per cent of the people who bring up the subject don't know what it really means. Your article certainly describes it and shows a very careful analysis.

We certainly know that automation can not be considered just a few pieces of special equipment . . . it certainly must be an over-all project. Furthermore, we, as tool builders, will not make machines on the strength of our interest alone. I feel that we should have to be coaxed by customers to make $200,000 and $500,000 machines, primarily for the purpose of prepayments and financing but also to assure complete co-operation in the projects. If the user does not have the will to make this expensive tooling work, there are all kinds of potential causes for failure.

Frank Zagar
general manager
Zagar Tool Inc.
Cleveland

Heat Treating Below Zero

We have read with some interest your article, "Below Zero Heat Treatment" (June 28, p. 104), by Rolland S. Jamison, Cincinnati Sub-Zero Products Co., Cincinnati. Please send us six tear sheets of that article.

B. W. Goldberg
executive engineer
Utica Division
Bendix Aviation Corp.
Utica, N. Y.

Please send me a tear sheet . . .

H. L. Myers
chief metallurgist
Power Tube Division
Raytheon Mfg. Co.
Waltham, Mass.

• *Sent.—ED.*

DEEP DRAWS
hot-rolled strip steel from WEIRTON STEEL COMPANY
Weirton, West Virginia
NATIONAL STEEL CORPORATION
WEIRTON STEEL COMPANY

This little red wagon presented a big drawing problem!

A Standard engineer's advice helped cut rejects by over 90%

● In the manufacture of children's wagons at the Steger Products Manufacturing Company in Steger, Illinois, 20-gauge cold rolled steel is drawn to a 4½" depth. Of the 8-hour shift capacity of 1600 to 1800 wagon bodies, up to 20% formerly wound up as rejects. Also, it was necessary to clean the dies after every 10 to 15 bodies. A single small scratch on the die caused excessive die galling and torn or ruined bodies.

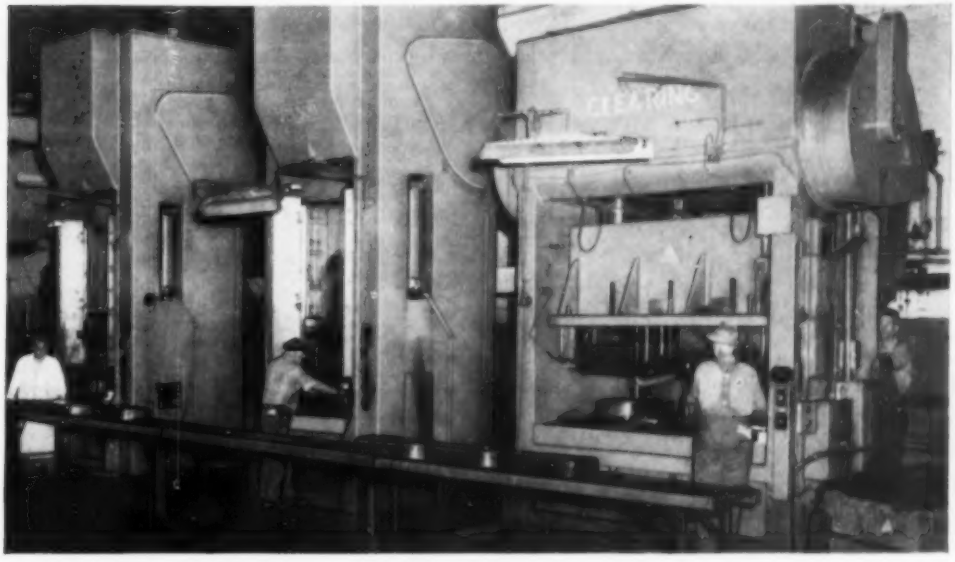
The company tried 10 or more drawing compounds without solving the problem. Then a Standard Cutting Oil Engineer suggested STANICOOL HD Soluble Oil.

That was six years ago and STANICOOL HD is still on the job. The reject rate has been reduced to less than 1% a day. Die galling has come down to almost nothing. Dies are now cleaned only once or twice daily. Again, Standard Oil's metalworking products prove they can do the hard jobs better!

STANICOOL HD Soluble Oil: for cutting and grinding operations, for certain forming operations. Mixes readily, non-irritating, anti-rust. To take full advantage of this many-purpose cutting fluid, call on the services of your Standard Oil Cutting Oil Engineer. If your plant is located in the Midwest, write Standard Oil Company (Indiana), 910 S. Michigan Avenue, Chicago 80, Illinois, to secure the services of the Standard Cutting Oil Engineer nearest you.

Standard's Bill Easterwood worked with the Steger Company on their drawing problem. Specially trained, Bill Easterwood is one of a corps of cutting oil and lubrication engineers headquartered near your plant throughout the Midwest. There's a specialist to assist you with *your* lubrication problem.

At Steger, die cleaning is of major importance because a single scratch can result in torn or ruined bodies during the processing. Since the introduction of STANICOOL HD, the time-consuming die-cleaning operation has been safely reduced to an *effective* minimum.



In this deep-draw operation STANICOOL HD is used just as it comes from the barrel without the addition of water. The 22-gauge cold rolled steel is drawn to a depth of 4½". The sheets are dabbed with STANICOOL HD as they are put on the press. Breakage which formerly had been a major problem has been reduced to a point where it is no problem at all.

STANDARD

STANDARD OIL COMPANY *(Indiana)*

A complete line of metalworking products including: STANICUT Cutting Oils—Special duty cutting oils with correct proportions of extreme-pressure and friction-reducing ingredients. STANOSTAMP Compounds—Three established products for stamping or heavy drawing operations on either low-carbon or alloy steels. SUPERLA Quenching Oil—For quenching work on systems where cooling facilities are limited and bath temperatures are high; efficient quenchings of large forgings.

For superior cutting performance with *safety*, insist on Star Unbreakable High Speed Steel Flexibles. No premium price for safety, fast cutting and long life.

They are made with a high speed steel toothed edge, welded by a special process to a flexible steel back. Eliminate tearing along weld—shattering—flying pieces.

Order Star High Speed Steel Flexibles from your Star distributor. And remember, he carries the leading lines of all kinds of tools and industrial supplies. And on extra-difficult metal sawing problems, he will quickly get a Star factory representative to help you.

Sold Only Through Recognized Distributors.

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Makers of Hand and Power Hack Saw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemson Hand and Power Lawn Machines.

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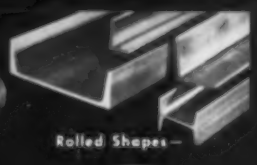
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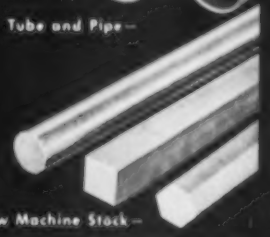
Tube and Pipe—

Bar Stock—

Fasteners—

Welding and Soldering—


Screw Machine Stock—

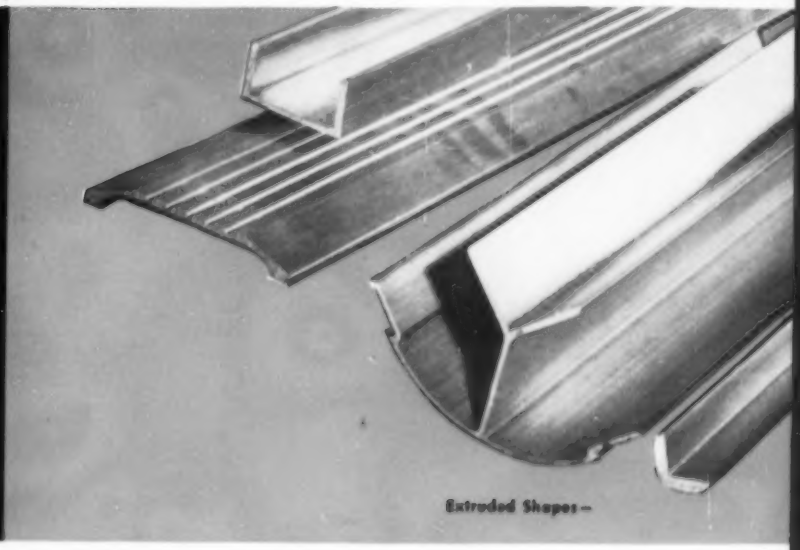
Built-up parts are no bargain; riveting and welding demand too many costly man-hours.

That's why production costs drop when you use aluminum extruded shapes. They take the handcuffs off your designer and allow him to distribute the metal where it's needed. Parts that would be prohibitively expensive to produce by assembly become practical. And while extrusion is not a precision process, tolerances are so close that only surface finishing is ordinarily required. Lengths run to 80 feet, maximum weights up to 600 pounds per piece.

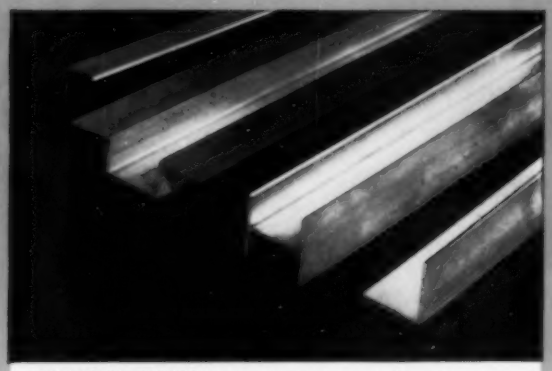
Alcoa operates the world's largest light metal extrusion facilities with 50 presses in five plants. With the experience of 50 years to draw on, Alcoa can show you how to take advantage of a broad line of standard extruded shapes or help you design for your own specialized requirements.

Alcoa
Extruded Shapes

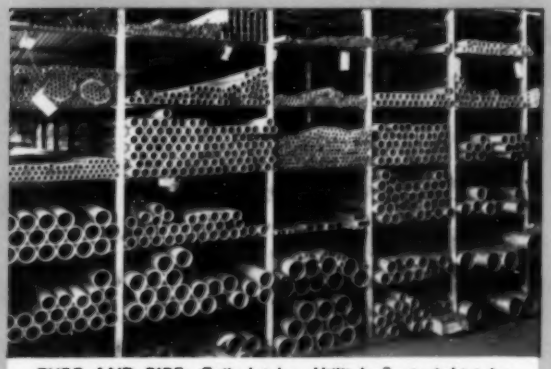
Can put the metal where you want it without time-consuming, costly assembly.


Extruded Shapes—

Products of Sixty-Five Years of Pioneering in Aluminum

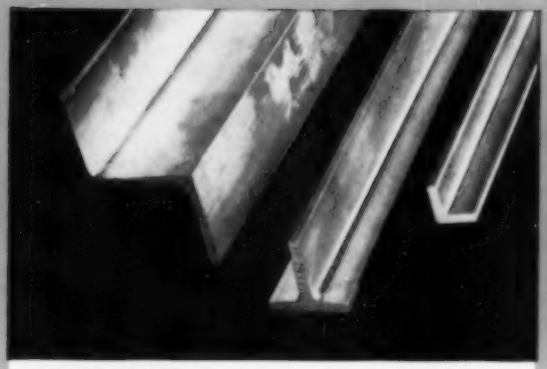


EXTRUDED SHAPES: For thresholds; window sills; door frames; glass stops; copings; gravel stops; trim; truck bodies. Also angles; channels; tees; zees; etc., for structures.

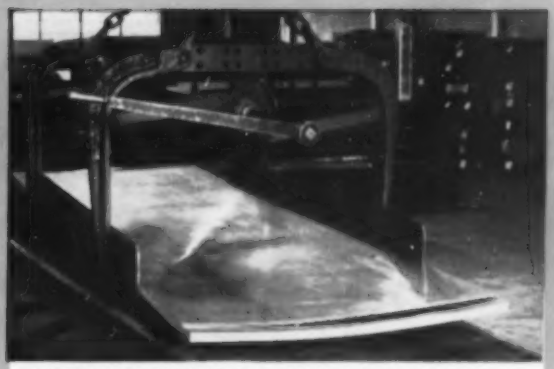


TUBE AND PIPE: Coiled tube; Utilitube®; straight tube in round, square and rectangular shapes; heat exchanger tubes; standard pipe and pipe fittings; construction pipe; rigid conduit.

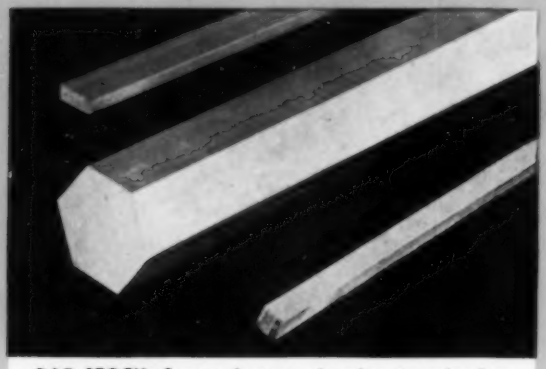
WIRE AND ROD: Coiled and straight length; flattened wire; rivet wire and rod for die heading operations in manufacture of rivets, nails, bolts and screws.



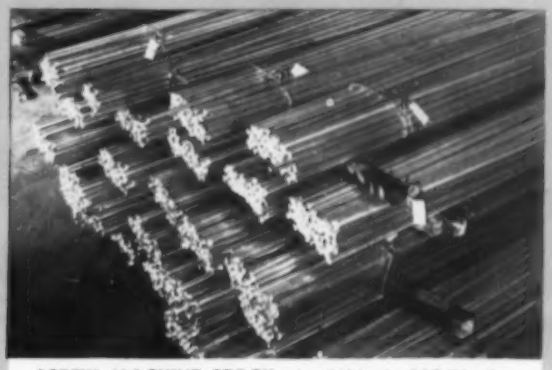
ROLLED SHAPES: Equal angles; unequal angles; channels; I-beams; H-beams; tees; zees. Suited to a variety of structural applications.



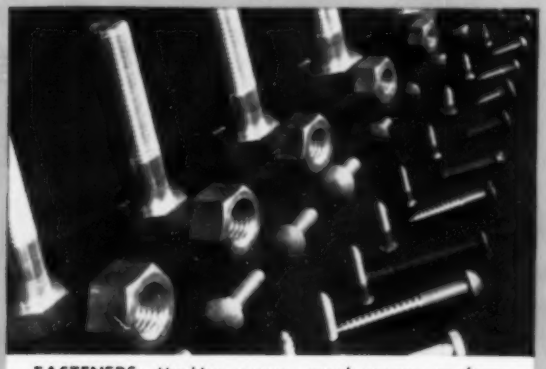
SHEET AND PLATE: Flat and coiled sheet; circles; patterned sheet; plate; tread plate; roofing and siding sheet; roofing accessories and fasteners; specialty sheet.



BAR STOCK: Square, hexagonal and rectangular bar stock in all commercial alloys. Hot rolled and cold finished to final dimensions for superior tolerance and finish.



SCREW MACHINE STOCK: Available in 11S-T3, the free-cutting alloy and 11S-T4, a higher strength alloy plus 24S, 61S and 75S.



FASTENERS: Machine screws, wood screws; washers; nuts; bolts; rivets. Recommended for fastening aluminum to prevent electrolytic damage.

WELDING AND SOLDERING: Welding and brazing wire; welding and brazing flux; solder flux; solder.

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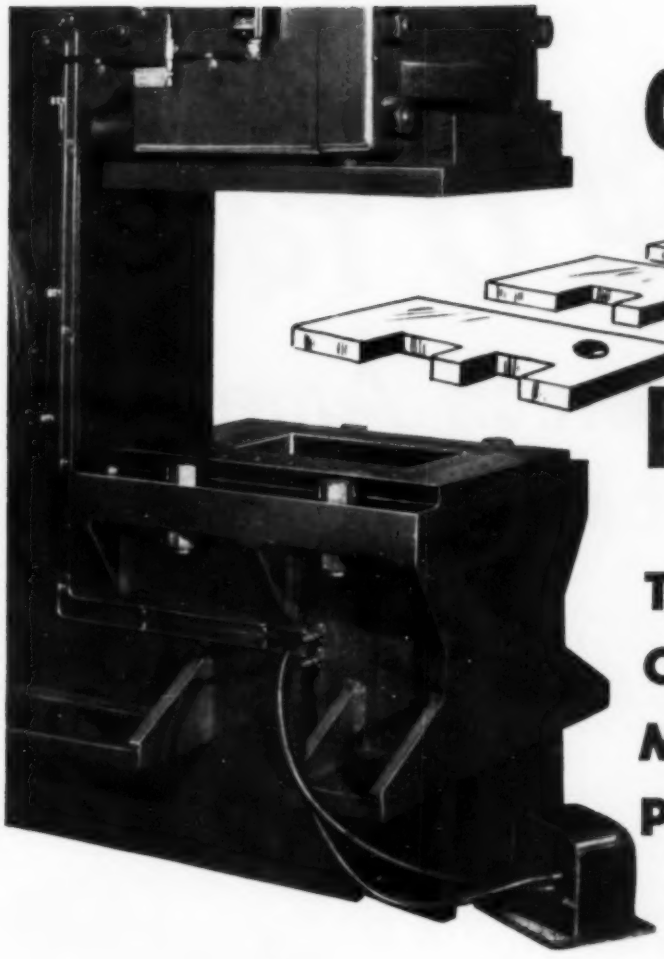
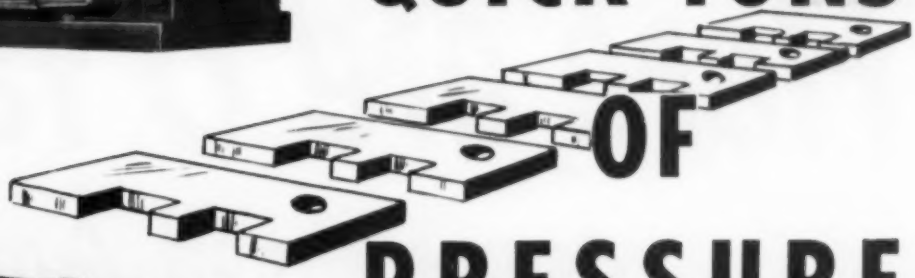


QUICK TONS OF PRESSURE



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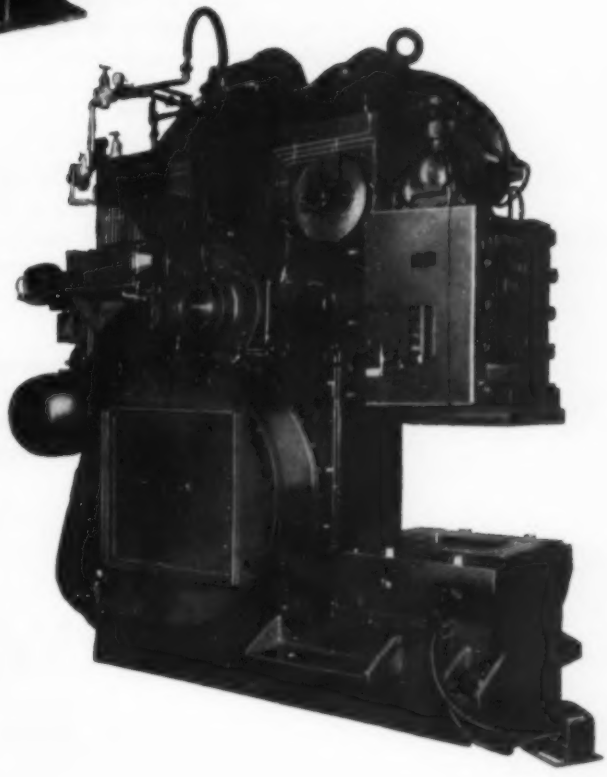

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Put your heavy jobs on this pay-off production basis—

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158 Mortimer St. Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING

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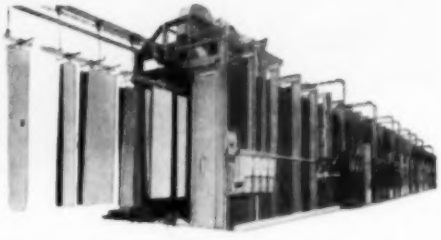
top men in American about a new service

1 Whatever your industrial heating and processing problem, this new Lindberg service can provide the answer. Its newly created Field-erected Equipment Division can now supply a complete planning, designing, manufacturing and installation service in this field, everything from a single furnace to a complete plant.

2 Lindberg is experienced in this type of service. Over a period of years, under certain conditions, it has been able to provide it to some industries. Now, with new plant and organizational facilities, this experience is available on a broader scale to help answer industrial heating and processing problems in most manufacturing fields.



Vitreous Enameling Furnace field-erected by Lindberg. 180 feet long, electrically heated with 32 zones of control.

3 For many years Lindberg's large technical staff and outstanding scientific laboratories have been recognized as leaders in metallurgical research. This background assures the technical know-how which you can depend on to provide the most effective and economical answer to your industrial heating and processing requirements.

4 Lindberg field-erected contracts are one-firm jobs. Modern plants, up-to-date equipment, experienced personnel and adequate material stocks assure that your installation will be completed on time and will operate with the full effectiveness planned for it.

LINDBERG

Chicago Plant: 2441 West Hubbard Street—Chicago 12, Illinois

Since 1935, Lindberg has been a leader in the development of industrial heating equipment.

*Industry should know offered by Lindberg

Lawrence Remiker

R. A. Hastings

Elmer B. Jones

C. P. Masure

5 A management staff of long experience in this field directs this new Lindberg Division. The men pictured here have spent a collective total of 97 years in planning, designing, erecting and servicing industrial heating and processing equipment. You can afford to depend on their proven abilities in this field.

6 Every contract will have on-the-spot service from one of Lindberg's expert Field Engineers who are located in 22 cities throughout the country. This personal, close-at-hand service follows right through from the original planning to the final installation. Lindberg Branch Offices are located in these cities:

Atlanta	Cleveland	Fairlawn, N. J.	Los Angeles	Pittsburgh	Springfield, Mass.
Buffalo	Dallas	Indianapolis	Milwaukee	San Francisco	St. Louis
Charlotte, N. C.	Denver	Kalamazoo	New York City	Seattle	Tulsa
Chicago	Detroit	Kansas City	Philadelphia		

To get the best possible help with your industrial heating and processing problems just call your nearest Lindberg Branch Office (you'll find the number in the Classified Telephone Directory or in the Trade Book Directories). One of our engineers will be on the job at once.

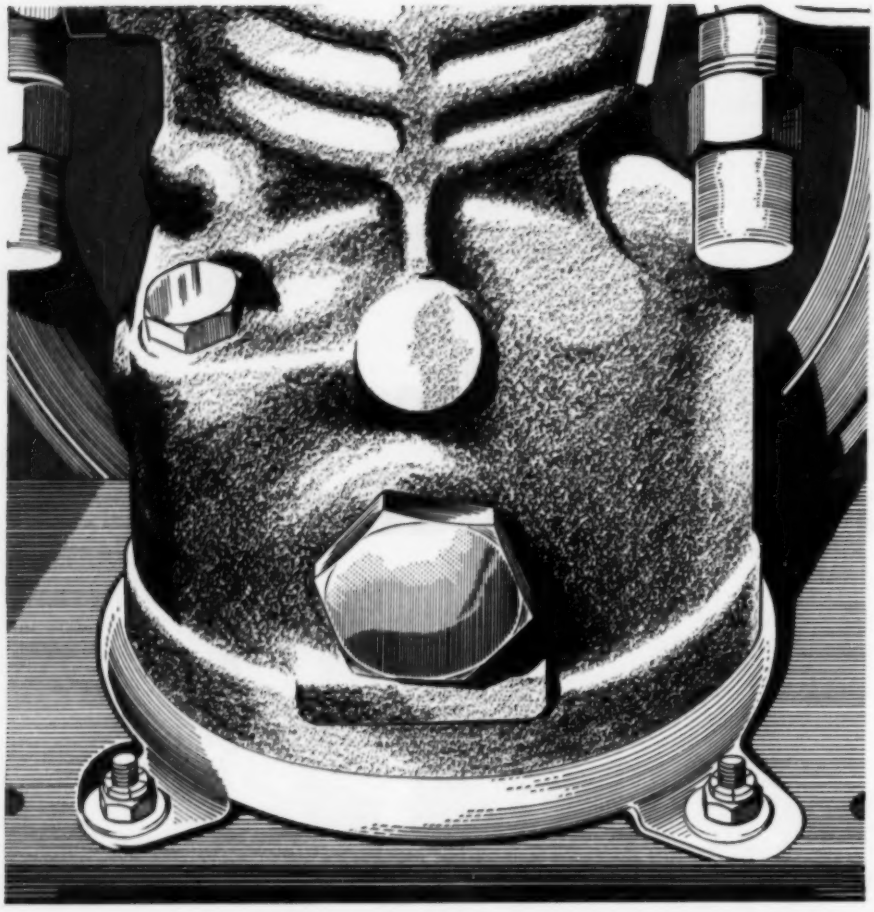
---

* *Lindberg Field-erected Division is ready to serve these industries: Aluminum, Automotive, Building Supplies, Copper & Brass, Ceramics & Glass, Plastics, Pulp & Wood Products, Steel and many others.*

ENGINEERING COMPANY

FIELD-ERECTED EQUIPMENT DIVISION

Los Angeles Plant: 11937 So. Regentview Avenue—at Downey, California

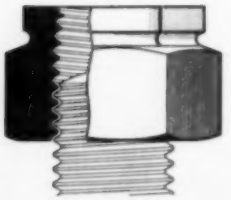


Many manufacturers use FLEXLOCS to fasten motors, compressors and other vibrating equipment to mounting plates. FLEXLOCS won't work loose . . . they eliminate costly service calls.

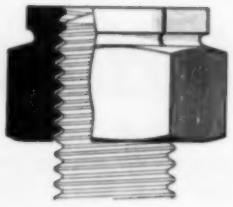
FLEXLOC locknuts reduce costly service calls

FLEXLOC locknuts do this because they stay put anywhere on a bolt as soon as their locking threads are fully engaged. Even the most severe vibration will not work them loose. FLEXLOCS offer many other advantages, too. *They are one piece.* They eliminate complicated, time-consuming methods of locking studs and bolts. They provide simpler, faster application and safer, more dependable locking than plain nuts and lockwashers, castellated nuts and cotter pins, nuts and jam nuts. They save buying, stocking and handling of extra parts. *They are all metal.* They have higher tensile strength than most other lock nuts. They permit you to stock only one nut for all temperatures to 550°F. *They are reusable.* They can be applied again and again without losing locking efficiency—a plus value in maintenance.

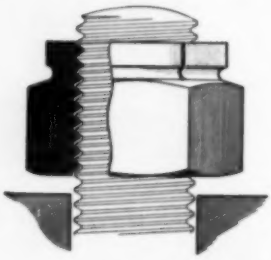
For information about FLEXLOCS and samples for test purposes, see your FLEXLOC distributor or write STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.



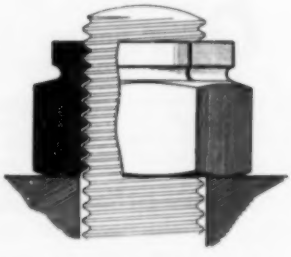
Starting. A FLEXLOC starts like any ordinary nut. Put it on with your fingers. Tighten it with a standard hand or speed wrench.



Beginning to Lock. As the bolt enters the segmented locking section, the section is expanded, and the nut starts to lock.



Fully Locked As a Stop Nut. When 1½ threads of a standard bolt are past the top of the nut, the FLEXLOC is fully locked. A FLEXLOC does not have to seat to lock.



Fully Locked As a Seated Nut. When it is used as a lock or stop nut, the locking threads of the FLEXLOC press inward against the bolt, lifting the nut upward and causing the remaining threads to bear against the lower surface of the bolt threads. Vibration will not loosen a FLEXLOC, yet there is no galling of threads.

FLEXLOC® LOCKNUT DIVISION

SPS
JENKINTOWN PENNSYLVANIA

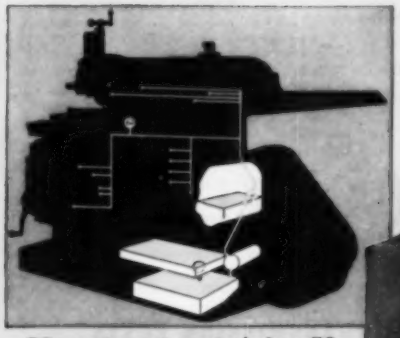
50 lbs. oil pressure

IS NECESSARY WITH A CUT LIKE THIS...

Demonstration cut.
Actual size steel chip, 2" cut .030" feed.

This tremendous cut demonstrates the extra strength, rigidity, and power in Cincinnati Shapers. It also demonstrates the ability of the 50 p.s.i. lubrication system to develop and maintain oil films under the heaviest loads.

Write for Catalog N-6.



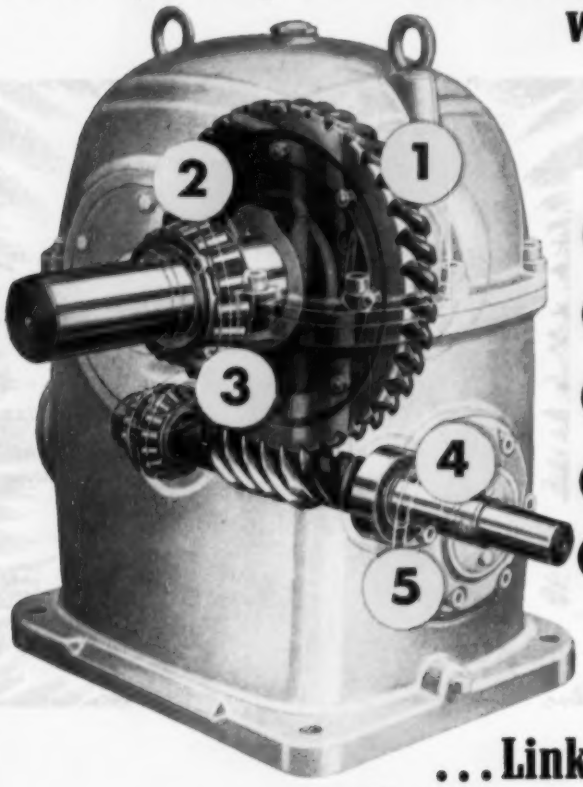
50 p.s.i. system includes 50 micro filter, settling basin and reservoir. Transmission runs submerged in oil.

CINCINNATI

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

When your speed reduction job calls for high ratios with right-angle takeoff . . .



1. **NICKEL-BRONZE WORM GEARS,** chill cast in dry sand, combine low coefficient of friction with high tensile strength.
2. **HIGH-CAPACITY ROLLER BEARINGS** take both thrust and radial loads. Lower wear and friction losses reduce maintenance.
3. **ALL-SPEED EFFICIENCY** results from reduced sliding action between worm threads and gear teeth, plus smoother power delivery.
4. **ONE-PIECE FORGED SHAFTS** are alloy steel, carburized and heat-treated for great impact resistance.
5. **AUTOMATIC SPLASH LUBRICATION** reliably supplies oil to all bearings and gear teeth at all speeds.

. . . Link-Belt gives you

everything you want in WORM GEAR DRIVES

With their compact, high-strength design, Link-Belt Worm Gear Drives permit high-ratio speed reductions in small space. High input speeds and low output speeds are provided, with ample capacity for heavy loads.

Three basic types cover the complete field of application: Single worm gear drives, helical worm gear drives and double worm gear drives. All are available with either horizontal or vertical shafts, and single or double gear reductions for convenient and compact connection.

Link-Belt Worm Gear Drives are available in 3.1:1 to 8000:1 reduction ratios, 1400 to 123,000 in. lbs. torque—0.22 to 564 output shaft rpm. Ask for Book 2324-A.

LINK-BELT 13,402

ENCLOSED GEAR DRIVES

WHY PRE-INTEGRATED LINK-BELT DRIVES CUT YOUR POWER TRANSMISSION COSTS

In addition to all three types of enclosed gear drives, Link-Belt builds variable speed drives, fluid drives—chains, sprockets, couplings, bearings, shafting, etc. All are pre-engineered for easy installation and maximum efficiency.

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

CALENDAR
OF MEETINGS

August 3-4, National Tool & Die Manufacturers Association: Board of trustees and committee meeting, Grand hotel, Mackinac Island, Mich. Association address: 907 Public Square Bldg., Cleveland 13. Executive secretary: George S. Eaton.

August 8-12, American Society of Sanitary Engineering: Annual meeting, Muehlebach hotel, Kansas City, Mo. Society address: 4716 Ewing Ave. S., Minneapolis. Secretary: Walter A. Dunn.

August 16-18, Society of Automotive Engineers Inc.: National West Coast meeting, Hotel Statler, Los Angeles. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

August 25-27, Western Electronic Show & Convention: Pan Pacific Auditorium and Ambassador hotel, Los Angeles. Business manager: Mal Mobley Jr., 344 N. La Brea Ave., Los Angeles 36.

August 30-September 3, Automotive Electric Association: Annual fall meeting, Vanss Springs hotel, Vanss Springs, Alberta, Canada. Association address: 802 Michigan Bldg., Detroit. Executive secretary: S. W. Potter.

September 1-16, International Electrotechnical Commission: Golden jubilee meeting, University of Pennsylvania, Philadelphia. Information: D. E. Denton, Public Relations Dept., American Standards Association, 70 E. 45th St., New York 17.

September 4-8, Pressed Metal Institute: Annual fall meeting, Manoir Richelieu hotel, Murray Bay, P.Q., Canada. Institute address: 2860 E. 130th St., Cleveland. Managing director: O. B. Werntz.

September 7-9, Industrial Truck Association: Fall meeting, Greenbrier hotel, White Sulphur Springs, W. Va. Association address: Washington Loan & Trust Bldg., Washington 4. Secretary: William Van C. Brandt.

September 7-9, National Fluid Power Association: Fall meeting, Hotel Commodore, New York. Association address: 1618 Orrington Ave., Evanston, Ill. Secretary: Barrett Rogers.

September 8-10, American Society of Mechanical Engineers: Fall meeting, Schroeder hotel, Milwaukee, Wis. Society address: 29 W. 39th St., New York. Secretary: C. E. Davies.

September 8-10, Porcelain Enamel Institute Inc.: Shop practice forum meeting, Urbana-Lincoln hotel, Urbana, Ill. Institute address: 1346 Connecticut Ave., N.W., Washington 6. Secretary: John C. Oliver.

September 10-11, Metal Powder Association: Fall closed meeting, The Homestead, Hot Springs, Va. Association address: 420 Lexington Ave., New York 17. Secretary: Robert L. Ziegfeld.

September 11-14, Packaging Machinery Manufacturers Institute: Annual meeting, Grove Park Inn, Asheville, N. C. Institute address: 342 Madison Ave., New York 17. Secretary: Miss Helen L. Stratton.

September 12-15, National Metal Trades Association: Eastern plant management conference, Sagamore hotel, Lake George, N. Y. Association address: 122 S. Michigan Ave., Chicago 3. Secretary: Charles L. Blatchford.

September 12-17, American Chemical Society: Fall meeting, Statler hotel, New York. Society address: 1155—16th St. N. W., Washington 6. Executive secretary: Alden H. Emery.

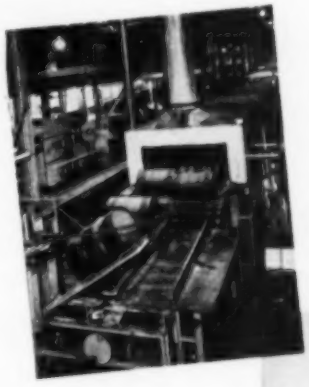
September 13-14, American Coke & Coal Chemicals Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute address: 711 14th St. N.W., Washington 5. President: Samuel Weiss.

September 13-15, Allied Railway Supply Association: Annual meeting and exhibit, Hotel Sherman, Chicago. Association address: 1200 W. Chase Ave., Chicago 26. Secretary: C. F. Weil.

September 13-16, Society of Automotive Engineers Inc.: National tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

UNITED STEEL DRUMS
ARE
Granodized
WITH GRANODINE®
FOR EXTRA PROTECTION

Steel Drums made by United Steel Barrel Company of Philadelphia, Pennsylvania, are chemically cleaned and phosphate coated in an integrated spray Granodizing process:



1. **ALKALI CLEANING** removes oil, grease, fingerprints, hand-marks, other surface soil;
2. **SULFURIC ACID PICKLING** then removes mill scale;
3. **GRANODIZING** converts the chemically cleaned steel surface to a uniform phosphate coating. The "Granodine" coating being non-metallic is an ideal bond into which the paint finish is "keyed" or anchored;
4. **"DEOXYLYTE" final acidulated rinsing** conditions the Granodized steel surface for optimum paint life.

UNITED DRUMS fabricated from Standard Gauge Steel are available in all sizes, with special linings for a variety of products, and decorated with any desired design.

- **EXTRA PROTECTION** for the finish—a lasting bond between paint and steel.
- **EXTRA PROTECTION** for the steel container—an inert barrier against rust creepage.
- **EXTRA PROTECTION** for the contents—chemically clean interior surfaces.
- **EXTRA PROTECTION** for the customer—an assurance of cleanliness, durability, and fine appearance.

Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT COMPANY

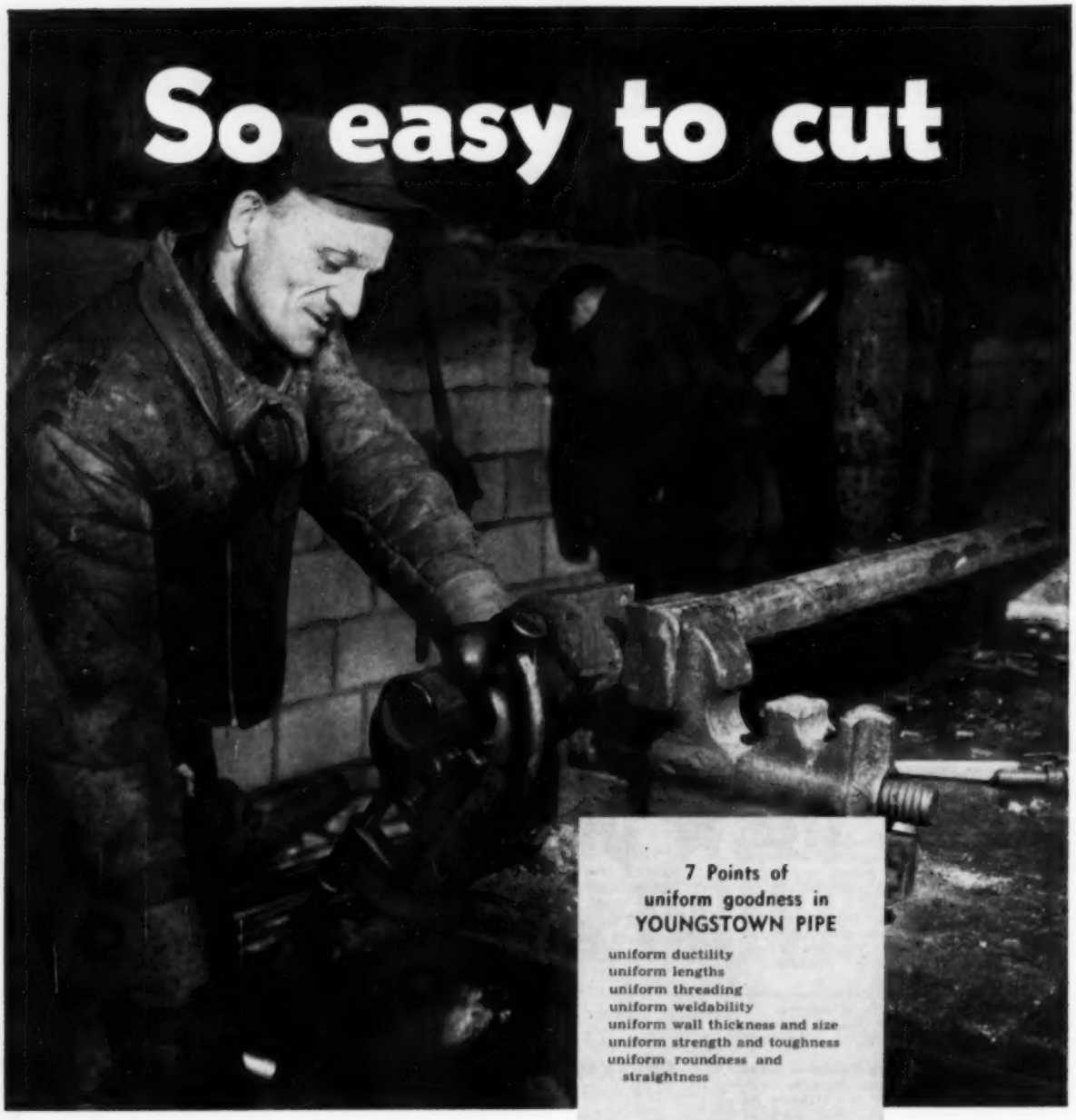
CHEMICALS ACP PROCESSES

General Offices: Ambler, Penna.

CHEMICALS ACP PROCESSES

Detroit, Michigan Niles, California Windsor, Ontario

So easy to cut



7 Points of uniform goodness in YOUNGSTOWN PIPE

uniform ductility
uniform lengths
uniform threading
uniform weldability
uniform wall thickness and size
uniform strength and toughness
uniform roundness and straightness

● Youngstown pipe is plenty tough—but it's not tough to cut. A few turns of the cutter and the job is done—fast, clean, perfect! You save installation time when you work with Youngstown pipe.

Youngstown

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THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

SLICKEST TUBE DRAW COMPOUND YET!

For steel, brass, copper...

SHELL CALMA COMPOUND K, a new product of Shell Research, is the economical answer to trouble-free tube drawing in both plug-draws and die-sink operations on steel, copper, brass and aluminum tubing. It remains stable for long periods in high bulk temperature operations.

Calma K gives off no noxious odor or fumes in either neat form or in the emulsion . . . perfectly safe for handling under all plant conditions. It's easy to use. It requires no boiling or cooking . . . simply mix it with hot water from the tap and it's ready for use.

Write on your letterhead for a one-pound sample for your own evaluation.

CHECK ITS ODOR.. CHECK ITS LUBRICITY... CHECK ITS VERSATILITY

SHELL Calma Compound K

SHELL OIL COMPANY

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SHELL

Is that

sales call

worth

$17.00?

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Today STEEL helps you do two jobs that provide the answer to that question

Seventeen dollars is the price industry pays today for the average sales call. When you're buying calls at this price, you've got two problems:

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To help you solve both, STEEL continues to gear its publishing and circulation programs to the needs of the world's largest industrial market.

That's why, through the pages of STEEL, you reach more U. S. metalworking plants with the most industrial buying power.

Moreover, you back your salesmen's efforts by talking to the "influential four" in metalworking . . . the key management, production, engineering and purchasing executives who say "Yes" or "No" to the order.

Isn't *this* the kind of help you want and need today to put action *into* and pull returns *out of* those $17.00 sales calls?

Talk to the man from STEEL. He has market facts and figures, and other sales direction aids you'll be interested in. STEEL, Penton Building, Cleveland 13, Ohio.

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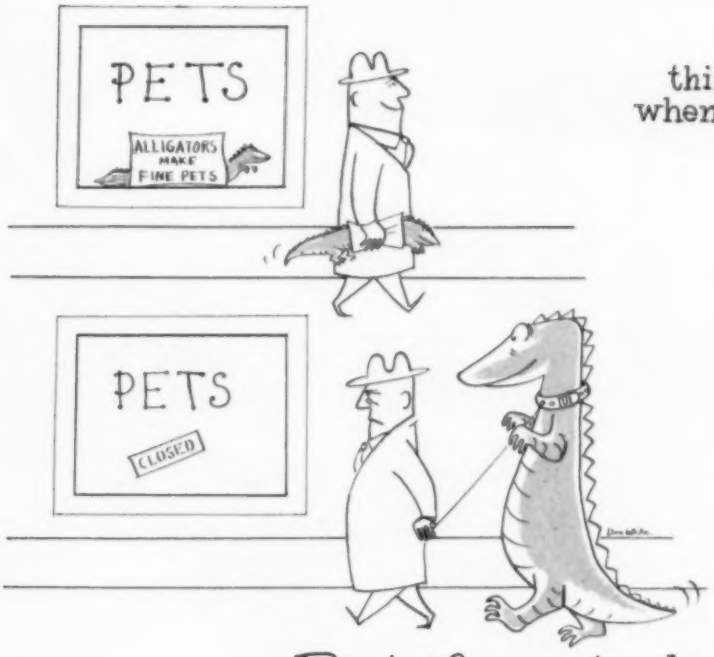

things to watch for
when buying alligators . . .

But if you're buying special purpose STEELS, may we recommend the SPEED STEELS

SPEED CASE — a low carbon free machining open hearth steel

SPEED TREAT — a medium carbon free machining open hearth steel

SPEED ALLOY — a chromium alloy steel

briefly they

- ✓ are easy to heat-treat
- ✓ are fast machining
- ✓ give longer tool life
- ✓ produce better finishes

THERE ARE SPEED STEEL SPECIALISTS IN...

☐ Akron, Ohio	Burger Iron Co.
☐ Bridgeport, Conn.	Bridgeport Steel Co.
☐ Buffalo, N. Y.	Beals, McCarthy & Rogers
☐ Cambridge (Boston), Mass.	Brown Wales Co.
☐ Chicago, Ill.	W. J. Holliday & Co., Inc.
☐ Dallas, Tex.	Earle M. Jorgensen Co.
☐ Detroit, Mich.	Peninsular Steel Co.
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☐ Indianapolis, Ind.	W. J. Holliday & Co., Inc.
☐ Lewistown, Me.	Brown Wales Co.
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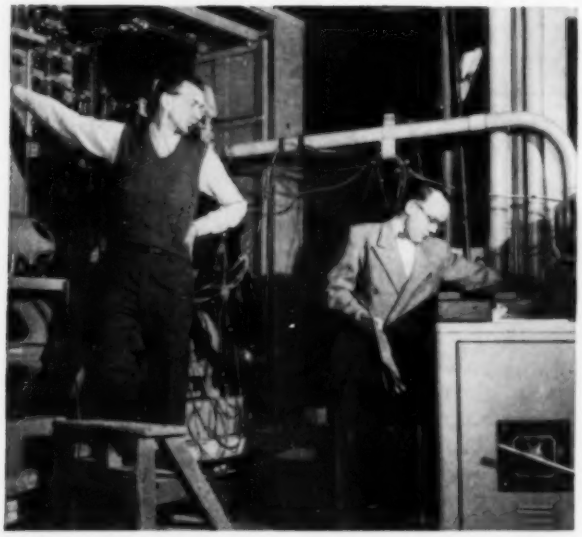
Speed steels are produced by W. J. Holliday & Co., Inc., Speed Steel Plate Division

HERE IS THE MOST modern adjustable speed drive available today . . . the compact, G-E packaged speed variator; drive motors, power unit and operator's control station.

GENERAL ELECTRIC



COMPLETELY PRETESTED by G-E engineers in the factory, the packaged speed variator comes to you tailored to your job. Picture shows a power unit on one of the factory tests.

PACKAGED DESIGN of G-E speed variator simplifies installation, saves space and lessens your maintenance problems. Picture shows ready accessibility of all parts.

4 Good Reasons for Buying G-E PACKAGED Speed Variators

There's a ***difference*** among adjustable-speed drives; here's why the General Electric ***packaged*** speed variator is your best buy:

1—JOB-TAILORED. When your new G-E drive is delivered, it has already been tailored to your specifications. It's coordinated, packaged, assembled and ***completely tested*** before it leaves the G-E factory. It's been ***engineered*** as a package to help meet your needs.

2—MORE COMPACT. Because there are only three components to the G-E ***packaged*** speed variator (see opposite page), less space is needed for the complete installation. This cuts down on costly, interwiring problems, and leaves valuable floor space available. The G-E packaged speed variator is designed to be located near your equipment . . . up above, in a basement, right next to drive motor . . . anywhere you wish. No need for expensive control housing and associated ventilating system.

3—FASTER INSTALLATION. Your installation costs drop radically and your new G-E drive is in operation faster because it's packaged in the G-E factory before it's shipped to you. Long, unproductive work-stoppages are no longer necessary.

4—LESS MAINTENANCE. Your speed variator is made up of the standard, General Electric controls and rotating equipment that have proven their reliability and long life in many thousands of applications throughout industry. Because of these top-quality G-E components, maintenance is only a routine problem. And even ***routine*** maintenance is simplified because of the ready-access doors on the equipment. This packaged simplicity pays off in less downtime and actual dollar-savings in maintenance each year.

For further information, see your nearby G-E Apparatus Sales Office, or send in coupon. General Electric Company, Schenectady 5, N. Y.

Progress is our most important product

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Send coupon for your copy of new, 20-page bulletin (GEA-6127) on G-E packaged speed variators.

Section K822-1
General Electric Co.
Schenectady 5, N. Y.

Please send my copy of GEA-6127.

☐ For reference purposes only.
☐ For immediate application.

Name _____

Address _____

City _____ State _____

How this "S" Monel Sleeve... costs Con Edison less than plain water!

"Machined in the Mold." All the machining required to form the three steps on this "S" Monel shaft was eliminated by Inco casting specialists. They turned the trick in the centrifugal mold itself by using a special carbon insert. Result: a shaft sleeve with three different outside diameters and a constant inside diameter — *as cast!*

At Consolidated Edison's East River Station, they used to replace shaft sleeves in the circulating pumps within 2½ years — often sooner.

And you can easily understand why. New York's East River is both salty and sandy. Besides, two sewer trunks empty into the river less than 300 feet from the pump intake. When that gritty, brackish water gets in the gland seals, abrasion and corrosion go right to work on the sleeves.

Con Edison's maintenance engineers considered using fresh water in the packing gland. The cost of the water practically ruled this out. Then they compared the cost of "S" Monel sleeves with the price of those they had been using. If "S" Monel sleeves lasted long enough in the salt water, they'd more than pay their own way. *It was worth a try.*

Did the "S" Monel sleeves work out satisfactorily? Here's the answer in Con Edison's own words:

"The first of our 'S' Monel sleeves was installed in 1949. The extra cost of a new 'S' Monel sleeve—installed—is less than the added cost of supplying plain water to the gland."

Perhaps an Inco Casting—or an Inco Nickel Alloy — can solve a costly service problem for you. Our 16-page booklet, *Standard Alloys for Special Problems,* is designed to help you select the Inco Nickel Alloy best suited to withstand destructive service conditions. Write us for a free copy.

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

INCO
TRADE MARK

Inco Nickel Alloys

MONEL® • "R"® MONEL • "K"® MONEL
"KR"® MONEL • "S"® MONEL • INCONEL®
INCONEL "X"® • INCONEL "W"®
INCOLOY® • NIMONIC® Alloys • NICKEL
LOW CARBON NICKEL • DURANICKEL®

Metalworking Outlook

Steel Earnings: Surprisingly Good

Early steel company earnings reports for the first half show declines from the same six months last year, but the drops are not disastrous. Republic Steel Corp. has net earnings of $24.8 million this half, compared to $28.7 million in the 1953 period. Youngstown Sheet & Tube Co. earned $9.1 million in the 1954 first half and $14.9 million in 1953's first six months. Allegheny Ludlum Steel Corp.'s $1.9 million in this year's first half compares with $4.3 million in last year's first six months. The end of the excess profits tax was a big help this year. Republic and Youngstown both had better second quarters than first periods this year.

Another $1 Billion for Aircraft

The Air Force will sign contracts for $1 billion worth of new aircraft in the next four months. The big chunk of the money will go into North American F-100 Supersabre jet fighters. The Air Force entered the present fiscal year with $4.5 billion in unobligated aircraft procurement funds. As an indication of the greater business optimism among aircraft companies, Boeing Airplane Co. expects its rate of return on sales this year to be between 3 and 3.25 per cent, up from only 2 per cent last year.

Hester Housewife: Metal Buyer

Watch for an upturn in housewares—the frying pans, pots and other utensils that are the small-scale capital equipment of your home. Some $2 billion worth was sold last year, and even more may go into housewives' hands in 1954. Helping sales are a host of new gadgets on the market, like Reynolds Metals Co.'s corn popper or Eastern Metal Products Co.'s aluminum electric skillet and a host of other gadgets. Partly as a result of a boom in housewares and other items for the home, hardware stores are doing better, too.

Railroads Purchase Less

In sharp contrast to the houseware picture is the railroad equipment situation. Deliveries of new domestic freight cars in June totaled 2650, compared with 3173 in May and 6463 in June, 1953, American Railway Car Institute and Association of American Railroads announce. The backlog of cars on order as of July 1 was 13,860, compared with 15,615 on June 1. Class I roads installed 788 new locomotives in the first half, compared to 1296 in 1953's first six months.

Zirconium: Cheaper Sponge?

Keep an eye on the Bureau of Mines' new program to develop a less costly method to produce ductile potassium-free zirconium, now selling at about $10 a pound in sponge form. The metal does not sustain a chain reaction and hence is being used principally in building hot atomic ovens for the Atomic Energy Commission. Present production is by the Kroll process. Major producers: Bureau of Mines, Albany, Oreg.; Titanium Alloy Mfg. Division of National Lead Co., Niagara Falls, N. Y., and Carborundum

The Technical Outlook—p. 87 The Market Outlook—p. 125

Metals Co. Inc., Akron, N. Y. At Albany, 280,000 pounds of sponge were produced in 1953.

Senate Looks at Raw Materials

The Senate Committee on Interior & Insular Affairs will investigate the accessibility of critical raw materials to the U.S. The group will look into "the best means, methods and devices to foster the greatest measure of self-sufficiency of critical materials that can be produced within the U.S. and the western hemisphere and to expand and develop the strategic minerals industry." Special attention will go to new developments and discovery of materials, including synthetics, which may be used as substitutes.

Mr. Ferguson Moves on

Harry Ferguson may get into the auto business. He sold some 1,805,000 shares worth more than $14 million in Massey-Harris-Ferguson Ltd., Toronto, the farm equipment combine formed last year. He says he will work on nonfarm inventions. Most probable device: A farm runabout something like a jeep, to be built by some established company, perhaps Standard Motor Co. Ltd., British organization with which he has had connections.

No Laws Needed

Don't expect legislation to get the U.S. out of competition with private business. The House Government Operations Committee was impressed with the recommendations of Lothair Teetor, assistant secretary of commerce, who told it that laws on the subject aren't needed. "We're making progress now," he says, "and soon there will be little criticism" in that area.

Straws in the Wind

Wilputte Coke Oven Division, Allied Chemical & Dye Corp., will build three 64-oven coke batteries at Clairton, Pa., for U.S. Steel Corp. . . . International Harvester Co. in August will introduce a powerful torque converter crawler tractor . . . Liquidation of Pressed Metals of America Inc., Port Huron, Mich., appears certain following failure of management and the union to agree on a new contract . . . Radio Corp. of America says it has a new 21-inch color television tube with a viewing area of 250 square inches, the same as that of a 21-inch black-and-white set . . . Blaw-Knox Co. President W. Cordes Snyder Jr. urges a quick start on the President's $50-billion road program.

This Week in Metalworking

Leasing is catching on to put new zip in equipment marketing (p. 45) . . . Great Lakes ore carriers will lay up early this year because of high stockpiles (p. 46) . . . You can improve your industrial communications with better telephone and postal efficiency (p. 48) . . . Industrial diamonds are smoothing things up for metalworking (p. 50) . . . The U.S. is spending a larger proportion of its gross national product on defense than any other nation this side of the Iron Curtain except Yugoslavia (p. 55) . . . Service sells, so industrial service schools are springing up everywhere in metalworking (p. 56).

Draw it!

Form it!

THE SPECIAL ZINC COATING ON THIS STEEL WON'T FLAKE

Try this drawing operation on ordinary galvanized steel and chances are the zinc will peel and flake under the strain, leaving bare spots for rust to attack.

With Armco ZINCGRIP it's a different story. This steel has a special zinc coating that stands up through any operation the steel can take. Draw it or form it—Armco ZINCGRIP won't lose its zinc coating.

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Fabulous Formula

Most persons now living who were born in the 19th century were brought up on the belief that it was wise to hang onto anything of value until it wore out. Henry Ford, Charles Kettering and others began to explode this theory when they introduced radical improvements in early automobiles so rapidly that owners became dissatisfied with their cars long before they wore out.

This idea of creating demand by making existing products obsolete has spread to other industries. The tendency of consumers to exchange outmoded models for better ones has become a major characteristic of the American economy. Also, brand new products are being developed and placed on the market at a faster rate than ever before.

Much of this speed-up can be attributed to the tremendous growth of industrial research. In the June issue of *The Atlantic Monthly*, Sumner H. Slichter points out that expenditures for organized research in industry in the eight years from 1946 to 1954 were twice as large as those for all the years preceding 1946.

Dr. Slichter places great emphasis upon the fact that this upsurge in research affects the demand for goods as well as the production of goods. He asks if there is any assurance that technological research will increase the demand for goods as rapidly as it increases the capacity to make goods. We cannot be absolutely certain, he says, but he believes the chances are good that it will.

In fact, he is optimistic enough to declare that by virtue of the great potential of research, industry now is able within wide limits to control the demand for goods. This, he adds, "enables us to view the economic future in a new light—with a quiet confidence that the demand for goods can be made to grow as rapidly as our capacity to produce goods."

This is a highly significant statement because if Dr. Slichter is right—if by the proper utilization of research we can keep consumer demand on a par with or ahead of industrial production—we will have hit upon a formula that offers great promise for the future.

E. L. Shaner

EDITOR-IN-CHIEF

IMPROVED ADHESIVES: Modern adhesives are as different from the old fish glues of our childhood as day is from night, but relatively few persons outside of the adhesives industry are aware of the fact. Whereas the natural adhesives of past decades were limited largely to simple jobs, today's synthetic rubber or resin-based adhesives (p. 88) are so strong

and reliable that they may be used on the assembly line in the most exacting types of manufacture.

They are used for such high-strength applications as bonding brake linings, joining metal sheets for aircraft skins, vulcanizing heavy rubber sheet to steel rolls and mounting heavy machinery on rubber shock pads. Adhesives now are available which will provide strength in excess of 3000 psi.

To date aircraft manufacturers have made the greatest advances in the use of adhesives. No doubt there are many other manufacturers in the metalworking industry who could use adhesives profitably if they were better informed of their properties.

* * *

PHONES AID BUSINESS: Excellent communication service undoubtedly is one of the factors that has contributed heavily to the rapid growth of the American economy. On Jan. 1, 1954, there were 50.3 million telephones in the United States, of which 15 million are used primarily for business. Our 160 million Americans use more telephone service than all of the other 2 billion persons in the world.

In spite of this wonderful service, many industrial companies are not using it as effectively or as efficiently as they could. There are a number of simple rules in regard to the use of telephones for business (p. 48), which if followed systematically not only will save money but also will enable the phone user to improve his relations with other companies and individuals with whom he does business.

For instance, here is a simple and perhaps a trivial tip on phone etiquette: When your conversation is ended, hang up gently. If you have been talking to a customer, why not let him hang up first?

* * *

SEE YOUR POSTMASTER: Another important service of communications for business is the post office. Although industry uses telephone, telegraph and many other wire services liberally, it is forced to depend to a large extent upon the United States mail. Our postal service probably has deteriorated during the past several decades because the politically governed Post Office Department has not been able to keep pace with the spectacular gains of the private enterprise economy which it attempts to serve.

Nevertheless, the postal service (pp. 49, 50) is capable of doing an outstanding job for those who understand its problems. We would almost guarantee that if any manufacturer who thinks the Post Office is not serving him properly, would go to his local postmaster and outline his complaints, the P. M. would explain his problems and the two would wind up with an agreement to handle mail in such a way that the manufacturer and Uncle Sam both would benefit.

* * *

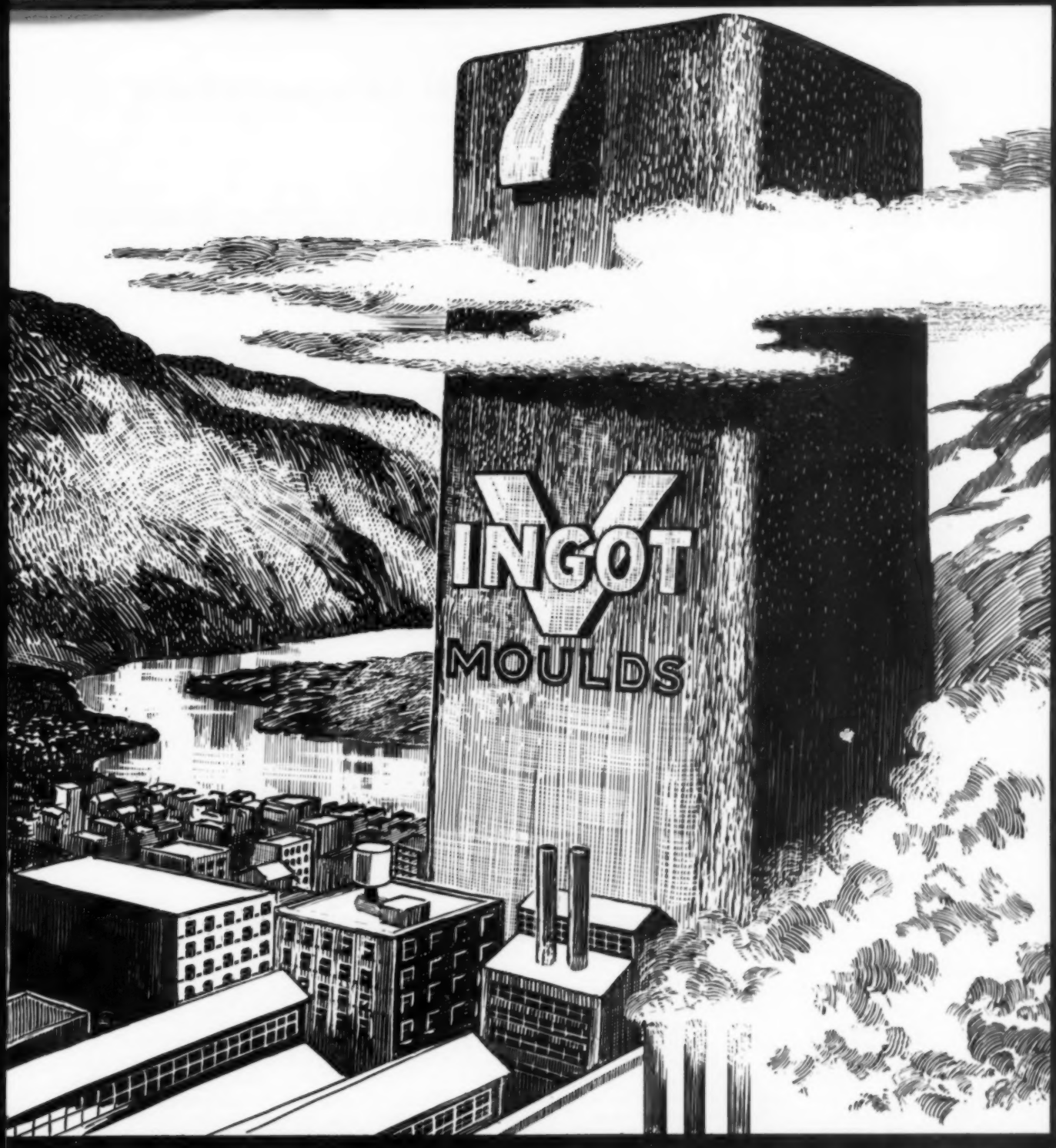
TOO MANY INHIBITIONS: Right now the Post Office is in a defensive position because of its heavy annual deficits. Some moves that many able career men in the department would like to inaugurate in order to make the postal service more efficient cannot be made because of political considerations. Also, Congress decrees that the Post Office operate in certain ways which provide subsidies for special groups. In other words, political and legislative factors combine to prevent the postal service from being operated on a business-like basis.

It is too bad that these political and legislative inhibitions seemingly have to prevail to the extent that they do at present. If these inhibitions could be minimized or wiped out entirely, then the postal service could be placed on a business basis, or even turned over to a private company for operation.

* * *

INDEED, WE ARE LUCKY: Before we dismiss the subject of communications, which we have been discussing from the angle of its great service to business, let us not forget how fortunate we are in the United States. We are one of the few nations on earth where the telephone and telegraph services are performed by private companies instead of by the government. We are one of the few where radio and television remain in private ownership.

Does this mean anything? It does, decidedly. The phone service in the United States is so far ahead of that in most other countries that comparisons are ludicrous. In 1946 most war-torn countries in Europe and Asia were using phone books of 1939 or earlier. Such books would have been worthless in the United States.



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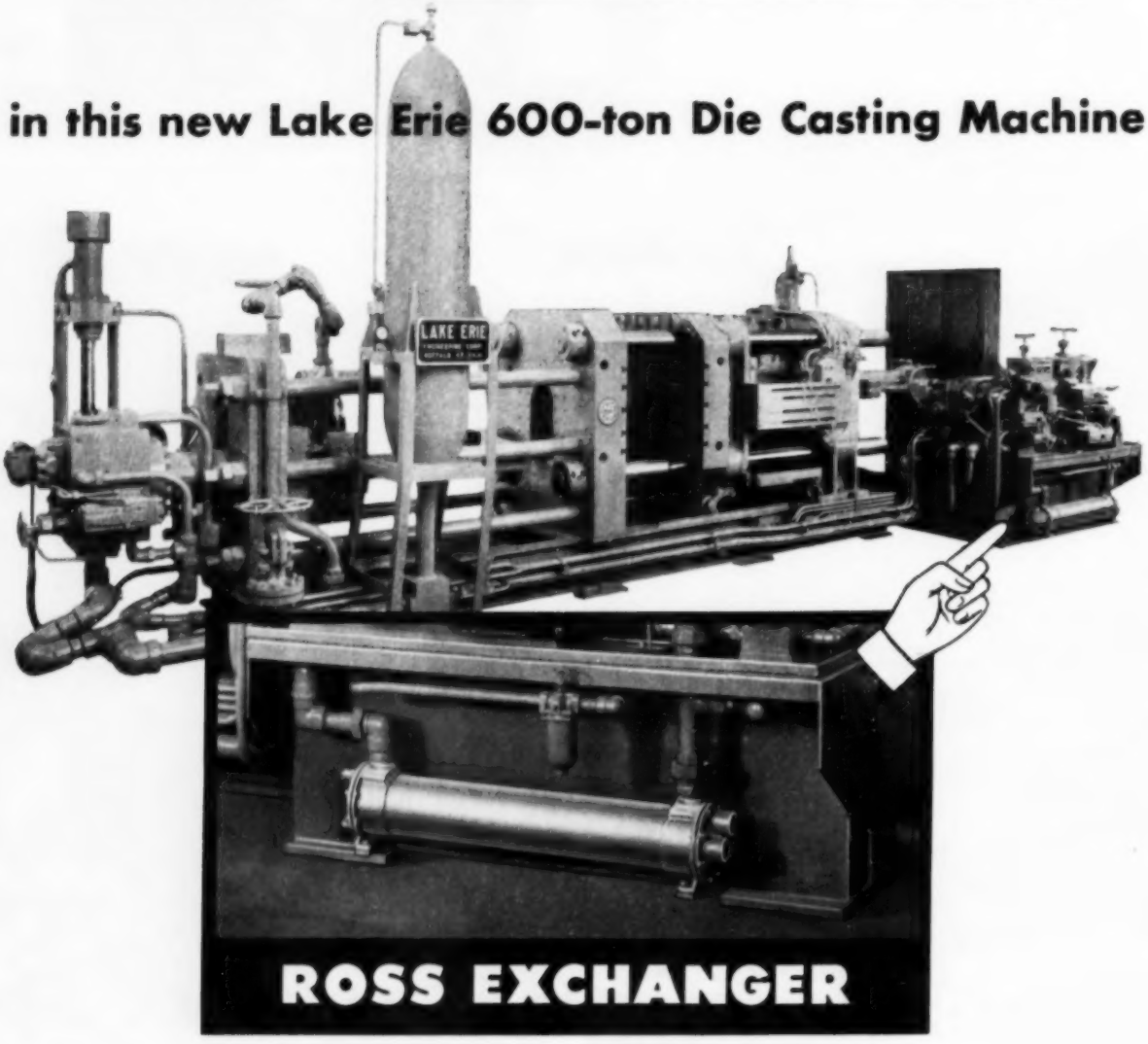

Operating at 450 free cycles per hour and capable of producing aluminum castings weighing up to 12 lbs., this new Lake Erie Model A-60 Die Casting Machine is rated at a locking pressure of 600 tons.

To insure combined 2-pump capacity of 20.6 gpm at 1000 psi, by providing safe, dependable oil cooling, a built-in Ross Type BCF Exchanger has been provided. *Hydraulic power losses, caused by excessive temperature, are thus prevented!*

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Rugged, dependable and top-rated for thermal efficiency, all copper and copper alloy Ross Type BCF Exchangers are preferred by manufacturers of numerous types of hydraulic machinery. Pre-engineered and fully standardized, they are stocked in a wide range of sizes to meet your needs . . . *promptly*.

For detailed information, request Bulletin 1.1K5.

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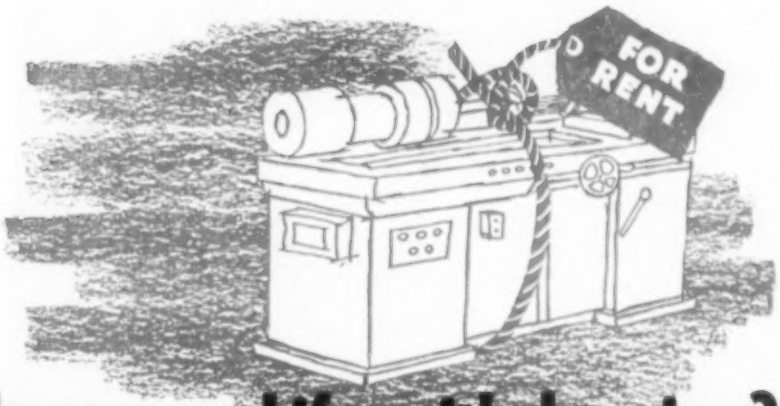


New Lease on Life with Leasing?

"LEASING has proved itself. It's a permanent part of our marketing plan."

So says Francis J. Trecker, president of Kearney & Trecker Corp., Milwaukee. Nearly as enthusiastic is Warner & Swasey Co., Cleveland. So convinced is Jones & Lamson Machine Co., Springfield, Vt., that it is announcing a new rental plan. While no formal programs have been announced, other machine tool builders, like Monarch Machine Tool Co., will also lease.

Spreading—Nor is the interest in leasing confined to tool builders. Lincoln Electric Co., Cleveland welding equipment producer, is starting to push a program. "The idea is spreading," says Frank Griesinger, Lincoln's assistant treasurer.

But even the most enthusiastic advocates agree that renting is just part of a general marketing program whose most important feature will always be sales (see STEEL's leasing series, beginning Mar. 29, p. 67). Probably less than 5 per cent of all privately owned capital equipment is leased in the U.S. In the long run leasing costs more, although the initial capital outlay for the lessee is less. There's also more red tape than in sales.

On the Plus Side—Kearney & Trecker finds that leasing's major appeal is the low initial capital investment needed. And that appeal is for both large firms with strong financial backing and smaller companies with limited financial resources. Says Mr. Trecker: "A large corporation leased one of our milling machines because it didn't have enough in the budget to buy it." Both K & T and Warner & Swasey also find that leasing helps sales. A user is attracted by the leasing plan, but finds on investigation that it can afford to buy.

About 15 per cent of K & T's current volume is on a leased basis. It has nearly $2 million worth of equipment out on lease and has spent $100,000 promoting the program. It has no big leasing programs with anybody; usually the lessee has only one or two machines.

On the Minus Side—Once the new tax law is passed, the more liberal depreciation provisions will probably lessen the interest in leasing. But leasing still will allow a faster write-off in most cases than sales under the new depreciation rules. The average rental plans are for five to seven years. Under the depreciation proposals, about two-thirds of the cost of the equipment would be written off in the first ten years if the apparatus had a 20-year life.

Jones & Lamson's manager of marketing, H. A. Finch, doesn't believe the new tax regulations will affect tool sales much one way or the other. And he thinks they will influence leasing only moderately.

Up in the Air—Still vague in the leasing situation is the Internal Revenue Service's position on when a lease is a lease or just a conditional sale. The key there is the purchase option clause which many lessees insist upon. IRS has ruled in some cases that the purchase option makes a "lease" a conditional sale, so that "rent" is not subject to tax deduction as a business expense. As a result, Gisholt Machine Co., Cincinnati Milling Machine Co. and the others that offer leases all advise their customers to forego the purchase option. The advice is not always taken.

Kearney & Trecker thinks the machine tool industry would be aided if more builders leased. Then a customer that wanted to lease a complete machine tool setup could rent the whole works. Now, he can lease some but would have to buy other tools. Not all builders or other capital equipment manufacturers go along with that reasoning. But more and more agree with Jones & Lamson's Mr. Finch: "All signs indicate that more capital equipment will be leased in the future."

U. S. Steel Corp.

Iron Ore Shippers Face Easy Season

Big spring ore stockpiles plus reduced steel operations have taken the tonnage pressure off the lake shippers for the first time in 16 years

THE PRESSURE'S OFF the iron ore lake carriers for the first time in 16 years.

The reason: Stockpiles are bulging and steel operations have averaged only 70 per cent of capacity this year.

The Totals—Ore shipments for the week ended July 19 totaled 2.5 million gross tons, about 1 million under the like week in 1953. That brought the total for the season to 28.9 million tons compared with 44.7 million tons last year, according to the Lake Superior Iron Ore Association.

Stockpiled as of July 1 were 34.9 million tons of ore, a 16-year record high for that date. June consumption amounted to only 5.4 million tons, well below the several 8-million-ton months recorded in 1953. Of the nation's 203 blast furnaces, 131 are currently in operation.

Earlier Layup—The large stockpiles and comparatively low steel operating rate indicate that the shipping season may be shortened this year. Pittsburgh Steamship Division, U. S. Steel Corp., has its 59-vessel fleet in operation, but officials report that some may have to be taken out of service soon.

Shipping season at Cleveland Cliffs Iron Co. didn't get under way until about April 10, about the same date as last year. "We have 12 of our 19 vessels in service," officials report. "We expect that some of the ships will be taken out of service earlier than usual this year, but as yet we have no definite plans to do so."

Tonnage Estimate—Last year's record 95.8 million tons of ore shipped in lake carriers left a stockpile of 41.9 million tons on Feb. 1, 1954. This stockpile plus reduced operations have caused fleet operators to revise shipping estimates from 75 million to 65 million tons for 1954.

Caland Launches Dredge Hull

The first of two hulls which will ultimately carry two of the world's most powerful dredges has been launched by Inland Steel's Canadian subsidiary, Caland Ore Company Ltd., at Steep Rock lake near Atikokan, Ont.

The dredges are to be used to remove an estimated 160 million cubic yards of silt from the east bay of Steep Rock lake to allow Caland to mine an extensive deposit of iron ore which lies beneath the lake.

Nickel Project Nears Finish

Experimental operation is beginning at the new multimillion-dollar nickel installation at Riddle, Oreg. The M. A. Hanna Co., Cleveland, project is expected to be in production sometime in the fall.

Open pit mining will be used to tap the deposit, the only major one in the country.

Titanium Stockpile Ordered

The Office of Defense Mobilization has ordered the stockpiling of titanium sponge as a strategic and critical material. This action brings to 75 the number of materials being stockpiled.

However, it may be several months before purchases for the titanium stockpile are made, Director Arthur S. Flemming said, due to the necessity of determining specifications of the metal and storage conditions.

Federal funds totaling $128 million have been committed under the Defense Production Act to help finance new plants. Some of the money is being used to buy titanium sponge that exceeds market needs for later resale to defense industry.

Fast Tax Write-Offs Granted

Petroleum refining and pipeline facilities and railroad equipment headed the latest list of fast tax write-off grants issued by the government.

The largest award went to Avtane Refining Co., Freeport, Tex., for petroleum refining facilities, $15,694,000 with 100 per cent allowed on $7,150,000 and lesser amounts on the remainder.

Lakehead Pipe Line Co. Inc., Superior, Wis., and Chicago, Milwaukee, St. Paul & Pacific Railroad Co., Chicago, received the second and third largest awards. Lakehead's was for petroleum pipeline facilities, $15,311,000 with 15 per cent allowed. The railroad's was for deisel locomotives, $8,937,748 with 55 per cent allowed.

U.S. Budget Pared

House cuts appropriations to $49 billion. Shipyard aid gets approval

CONGRESS IS DRAWING the nation's purse strings tighter by nearly $5.5 billion this year. Appropriations for fiscal 1955 will come to approximately $49 billion, compared to $54.5 billion last year.

The $49-billion figure includes the $43.2 billion so far appropriated, plus estimates of the two appropriations still waiting for approval before Congress adjourns. These estimates are $3.1 billion for foreign aid (passed by the House) and $2.7 billion for the First Supplemental Bill for Fiscal 1955 (the amount approved by the House Appropriations Committee).

The Cuts—The House committee cut several items from the supplemental bill. Biggest cut was from $1.1 billion to $571.6 million for new funds for military construction. Other cuts were made in unemployment aid to states, aid for hospitals and clinic building and Hoover Commission funds.

Left in the bill were $380 million for the stockpiling program, $82.6 million for experimental work on Liberty ship improvement and $22 million for airport construction aid.

Comparison — The administration's $47.5-billion figure is considerably below the Truman administration appropriation: $54.1 billion in 1950, $91.6 billion in 1951 and $75.3 billion in 1952. Even greater savings are envisioned next year; if the will of the Senate is adopted by the present session, the foreign aid program will be terminated in June 30, 1955, insofar as new funds are concerned.

Census Projects May Die

Odds have dropped to 50-50 on the chances for the Census of Business and Census of Manufactures materializing next year.

The House Appropriations Committee deleted the proposed $8.4-million set up in the administration's $2-billion supplemental request for the census projects. There's still hope that the Senate will amend the House bill to include the censuses, but nobody's willing to bet that the House conferees will agree to the addition.

The statistics involved in these censuses are considered essential to sound business planning, and business and manufacturing organizations are urging members to make the fact known to legislators. The last such censuses under normal peacetime conditions were taken in 1939; the 1947 censuses were taken under reconversion conditions after the war and are not of much value under today's conditions.

Army Vehicle Deliveries Set

Combat and tactical vehicles valued at $226 million will be procured for delivery from June, 1955, through May, 1956, according to an announcement from the Department of the Army. These will include the Patton M-48 medium tank, M-59 armored infantry vehicle, M-42 twin 40-mm self-propelled gun built on the light tank chassis and the five-ton truck.

All of the vehicles are now under production and are scheduled to continue under existing contracts through May, 1955.

The Fisher Body Division of General Motors Corp. currently produces the M-48 medium tank at its Grand Blanc, Mich., plant. The M-59 armored infantry vehicle is produced by Food Machinery Corp. in San Jose, Calif. The twin 40-mm gun is now being produced by Cadillac Division of General Motors Corp. at the government-owned tank plant in Cleveland. International Harvester Co. is currently producing the five-ton truck for the Ordnance Corps.

Conveyor Belt Eliminates Paper 'Pile-up'

WESTINGHOUSE Electric Corp. has solved the piling up of paper work at its new shipping and warehouse building in Pittsburgh. A conveyor belt keeps papers moving automatically so that orders are filled faster and with less effort.

The belt idea is an offspring of the 19th century drygoods store overhead basket. The paper conveyors hug pieces of paper, just as you would hold a paper between your lips, and open up to pick up and discharge their "passengers."

Two—There are two pressure-belt conveyors in the huge Westinghouse warehouse. One carries shipping orders from third-floor offices to packing areas; the other scoots bills-of-lading from traffic men on the third floor to the first-floor loading dock.

They handle an average of 200 shipping memos every hour, an equivalent of three orders each minute. To keep pace with the belt, a messenger would have to make a round trip of 100 yards up and down stairs, through doorways and around corners in one minute.

Verbal, Too—Even verbal communications have been taken into consideration. At East Pittsburgh a two-way loudspeaker is attached to each sending-receiving box. Thus packers 100 feet away from the sensitive speakers can carry on a conversation with clerks on the floor above.

Here's an example of how the belt saves time. Let's say a company orders 20 small parts from the warehouse. Clerks prepare separate shipping memos for each part and put them into the pickup box one by one. The papers can't pile up here for the belt rushes them to the packing areas.

Speed—Stockmen receive the memos, get the parts, attach one copy of the memo to the part and place it in a basket conveyor, which takes the order to the loading dock.

Meanwhile, another copy of the memo is traveling by belt to the traffic group. They prepare a bill-of-lading, which also travels to the loading dock by belt. When all 20 parts and bill have come through, the parts can be packed in one box and rushed to the buyer.

1. Answer promptly.
2. Speak in a natural voice. Talk straight into transmitter at a distance of about 1 inch.
3. Begin concentrating on the call immediately. The caller's opening statement often contains vital facts.
4. Take notes.
5. During the course of the conversation try to display the same tact and courtesy you would if your caller were sitting across the desk from you. Imagine his being there.
6. Hang up gently. If it's a customer, better let him hang up first.

IMPROVE YOUR

HAVE YOU EVER met yourself talking on the telephone?

If you could, it might be a profitable experience for you and your company. Many suppliers and customers form their impressions of you and your firm from the way you use the telephone.

The Pay Off—Improper use of the telephone can grind away at customer and public relations, maybe even lose an order. Better use of the ordinary phone, such as the one sitting on your desk now, can do much to gain acceptance for your firm. And you'll waste less time on the phone when you use it properly.

On Jan. 1, 1954, there were 15 million business telephones in use in the U.S., plus 35.3 million residence phones. American Telephone & Telegraph Co. reports the Bell System added 1.9 million telephones during 1953 alone. In this country 160 million Americans use more telephone service than all the rest of the 2 billion people in the world. Yet that communication network can be no more efficient than the people using it.

Peak Periods—So, let's analyze two common complaints from businessmen on what they think is wrong with telephone service. Many executives complain that switchboards are busy at the busiest time of the day. There are usually two business peaks, one in the morning between 10 a.m. and noon and one in the afternoon between 2 p.m. and 4 p.m. Calls made either before or after those peaks have a much better chance of finding a clear switchboard.

First cousin to that complaint is the one on slow connections with the proper party at the other end of the line. The Bell System has cut average connection time on long distance calls in the U.S. from 1.8 minutes in 1952 to 1.6 minutes in 1953 to less than 1.0 minute in 1954. But the Bell System can not eliminate a series of three or four persons within the private firm's organization who must handle a call before it gets to the executive desired. Cleveland telephone service engineers estimate the boss will take 7 out of 10 calls coming in directly to him and suggest that the boss answer his telephone without being short-stopped by the secretary when that's possible.

Same Old Place—Telephone company officials agree that it's the boss who sets the tenor of telephone usage throughout an organization. If he is telephone-conscious, everyone else will be too.

Telephone men also agree there are but two basic aims in proper telephone usage: Efficiency and courtesy.

Take efficiency. Each of the 15 million business telephones in the country has a number. Yet telephone operators still report high percentages of long distance calls being made to a personal or company name instead of a number.

Take courtesy. No businessman would dream of talking in person with a business contact while masked like the Lone Ranger. Yet many executives still fail to identify themselves when answering a telephone call.

Overlooked — It isn't necessary to look for spectacular ways to improve your company's telephone techniques. Areas needing improvement are usually common things. That's the trouble—they're not hard to find, just overlooked. In the accompanying table are pointers. If you're in doubt about your organization's telephone techniques, check with your local telephone company.

Beyond improving your company's telephone usage, your local telephone company can tell you of special phone services available to business organizations.

Foreign and Key — Ohio Bell Telephone Co., for example, offers foreign exchange service, Enterprise numbers and key-town service. Foreign exchange is the listing of Company "A" of X City, in the Y City directory. A call to the Y-City number is then connected directly to Company "A" as a local call. Enterprise-number service is the listing of Company "A" of X City in the Y City directory under an Enterprise number. A long-distance call to the Enterprise number in Y City, placed as a collect call, is connected to X City, but the challenge by the operator on accepting charges is eliminated. Key-town service means that a salesman for Company "A" of X City may go to Y City and place an uninterrupted series of

POSTAL POINTERS

INDUSTRIAL COMMUNICATIONS

calls to all his customers in that area with the bill being sent directly to Company "A".

Indicative of other special arrangements which can be made with ordinary telephone company equipment is the teletypewriter private-line network worked out for a major steel company. Customers have teletypewriters which send orders to the steel company's sales, credit, receiving and shipping departments simultaneously.

But remember those special telephone services and arrangements are icing on the cake. The basic question remains: Are you and your company quick, easy and pleasant to meet on the telephone?

The Mail Can Go Through

HAVING TROUBLE with the mails? If so, you have lots of company.

A firm in Cleveland lost an order because the Post Office took three days to deliver it from Detroit—even though it had been airmailed special delivery. In another case Cleveland delivery was made four days after the special delivery package was mailed in Washington.

The Human Element—These delays do happen and Post Office brass in Washington make no bones about admitting the fallibilities of postal employees. Human frailty

1. Don't hold your outgoing mail until 5 p.m. Get it to the local post office early—by noon, if possible. Consult your local postmaster as to your mailing system, with special reference to the post office time schedule in making trains and planes.

2. Put a special delivery stamp on the piece when early delivery is important—as in the case of a contract, order or payment.

3. Be sure the mail is correctly and legibly addressed, that it bears the address of the sender and that it bears the correct amount of postage.

4. If you're a large mailer, you can expedite handling by tying it securely into bundles marked "Out of Town" and "Local."

5. Always use the zone numbers when there are any (112 cities with population over 200,000 have them). Zone numbers are important because zone separations are often made en route to speed delivery.

6. Give the local post office your complete new address when you move. The only mail the post office will forward to the new address without extra postage is first class. To have other classes forwarded, you must guarantee to pay additional postage on delivery.

7. Wrap and pack your parcels securely. The address should be clear and legible, in center or lower right-of-center position, with return address in upper left-hand corner. Both those addresses should be on one side only of the parcel.

contributes to delays—since human hands, eyes and brains are requisite in collection, distribution, dispatch and delivery of mail. The Post Office wages a continuous fight against sloppy handling—a fight that never will be won completely as long as people are human beings.

But the Post Office says that sloppy handling occurs with an inappreciable percentage of the billions of mail pieces handled each year. In the great majority of cases delays result from patrons' carelessness. In fiscal 1952 alone 97,000 envelopes containing cash went to the dead-letter office because of hen-scratchy handwriting, addresses faded into illegibility through action of moisture—or because of red ink on red paper, white ink on white paper—and because of failure to denote the sender's address.

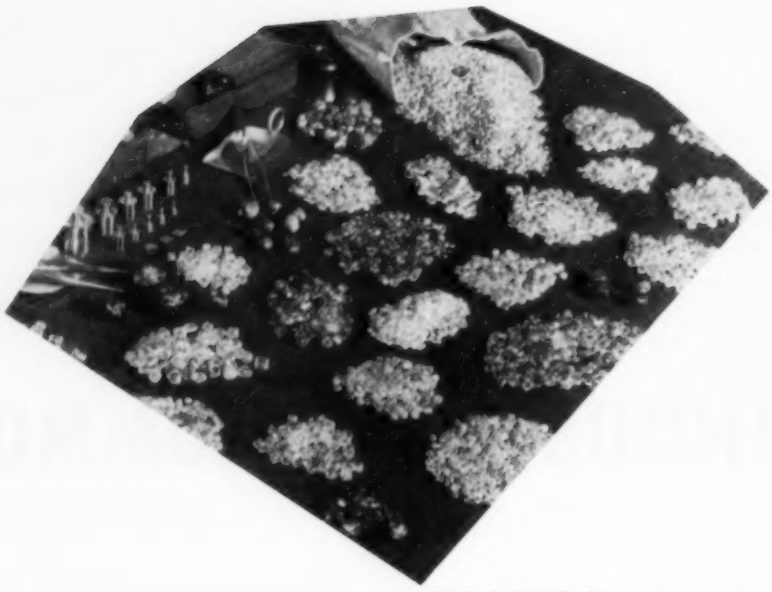
You Can Help—Such types of trouble are encountered more with mail of the "general public." Business firms do not usually make mistakes that might qualify as "stupid." But they often are guilty of carelessness which causes trouble for the Post Office Department and delays transmission of mail. For the benefit of STEEL's readers, a number of Post Office officials made up the list of precautions on p. 49 which, if observed, should lead to a sharp reduction in the incidence of delays in transmission of mail.

These precautions will not insure you against loss of mail when a plane crashes or a ship sinks at sea, when a package of mail at some transfer point gets soaked in a rain or snow storm, or when some local post office is flooded. But they are designed to help you get smooth service with transmission delays at minimum.

Grain Bin Contracts Awarded

Contracts for grain storage structures with total capacity of some 100 million bushels were awarded by the Agriculture department.

The structures will be located in areas where commercial storage facilities are limited and will be used only for storage of grain purchased by Commodity Credit Corp. under price-support operations.



Maurice S. Dessau Co. Inc.

Diamonds: Keystone of Industry

DIAMONDS are one of nature's most glamorous minerals, but the superhard stones are at least as much at home in a modern factory as they are on milady's finger.

About 85 per cent of all diamonds produced are for industrial purposes. A major use is in shaping and finishing cemented carbide products. Makers of diamond grinding wheels are heavy buyers. Machine tool builders, the aircraft industry, makers of small precision machinery, in fact, all industries doing precision grinding make good use of diamonds.

Mining, oil drilling and the glass industry are also big consumers.

Supplies Well Balanced — At present, supplies of diamonds and crushing bort (low-cost diamonds used to make diamond powder and diamond wheels and saws) are well balanced except for some scarcity in top-grade stones.

This is contrary to the situation of about two years ago when the National Production Authority restricted diamonds. Then, deliveries went up to 36 months and many users over-ordered causing an apparent shortage. When the directive was lifted last October the orders vanished, and so did the "shortage."

Deliveries Speeded — "You can get anything you want in bort today," says E. C. Graves, superintendent, fabricating division, Carboloy Department, General Electric Co. "Wheel delivery was 18 months 4 to 6 months ago. Today it's 4 to 6 weeks."

About 96 per cent of the world's diamond supply comes from South Africa, output being rigidly controlled by the British diamond syndicate. Most of the remaining 4 per cent comes from Brazil and Venezuela. The U. S. uses well over half of world production, estimates Frank Blaine of Maurice S. Dessau Co. Inc., New York, one of the oldest and largest U. S. industrial diamond companies.

About 70 companies in the U. S. process industrial diamonds in one way or another. Before World War II there were less than 25.

Imports Up—Imports over the past five years total about $170 million (exclusive of diamond powder and processed diamonds), an annual rate of $34 million. In fiscal 1954 imports hit $47,949,744, according to Athos D. Leveridge, executive manager, Industrial Diamond Association of America Inc. Of this, $19,163,662 was for crushing bort.

Estimates place weight of imports at between 10 and 12 million carats annually but, because of the many different grades of stones, it

is practically impossible to establish any relationship between weight and dollar volume of imports.

Varied Picture—Some diamond companies report demand off as much as one-third this year, but others report business at about year-ago levels.

Prices, except on top quality stones, have dipped—from 10 to 15 per cent, says C. R. Myer, manager, abrasives division, Elgin National Watch Co. This is about as low as they can go, he says, because the diamond syndicate keeps a floor under world prices. Lower prices in this country mean that domestic suppliers are taking less profit.

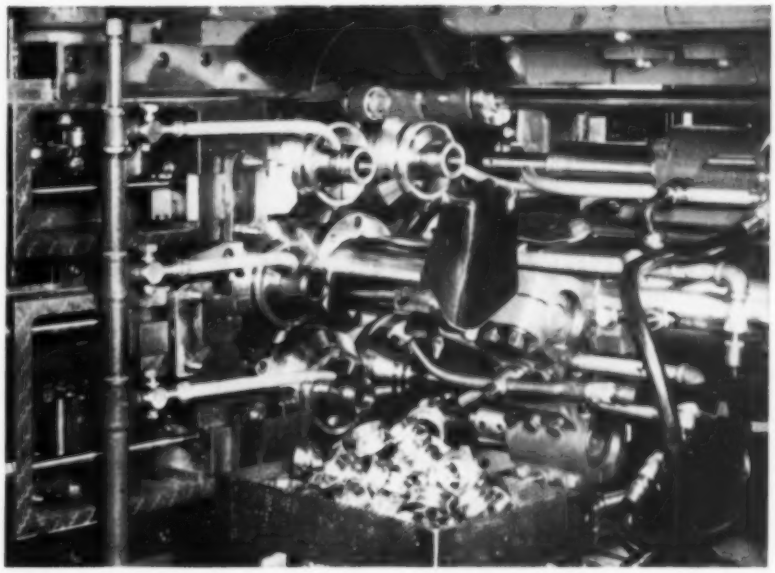
Longer Wear—A factor in reduced demand is industry's generally lower operating rate. "Under less heavy production requirements, diamond tools, diamond wheels and like products last much longer than when used under more abusive high production periods," says R. S. Fowler, vice president, Wheel Trueing Tool Co., Detroit.

A factor that may stimulate demand in coming months is a growing number of uses. Many of the new metals and superalloys are hard to machine on a lathe, increasing the call for diamond tools and wheels.

For Close Work — Shaped diamond tools are able to hold extremely close tolerances and contours necessary to produce turbine blades for jet engines. Boring and turning tools are being used with much success on older metals such as copper, aluminum and brass. Plastic and rubber industries are also entering the diamond market.

Industrial diamonds and bort are high on the government's list of strategic materials. Any re-exporting is strictly controlled by license from Bureau of Foreign Commerce. Each shipment is carefully inspected, and the shipper must show country of destination, consignee and end use.

There have been attempts to find substitutes for diamonds, but none is efficient or versatile enough as yet to make more than a very small niche in diamond's pedestal. Most promising are electrodischarge, ultrasonic abrasive grinding, silicon carbide belt and wheel grinding, and an electrolytic process.



Automatics Try Carbide Cutters

WITH CARBIDE TOOLS, the inner bearing races (above) are produced in about half the time it takes to do the job with high-speed steel tools.

This job is one of three now being tested in a joint development program sponsored by Cone Automatic Machine Co., Windsor, Vt., and Carboloy Department of General Electric Co., Detroit. They are studying the application of carbide cutting tools to automatic bar machines.

Hold-Outs—While carbides have cut a wide swath in most other metalcutting operations, automatics are practically virgin territory. With the multiplicity of operations often performed on one machine cycle, selection of the right carbide for automatics has been a tough nut to crack. When one tool fails, all operations must stop.

Big Field — Trends show a marked increase in the use of multiple-spindle automatics. One estimate indicates that there are more work spindles in use on these machines than there are on single-spindle automatics and turret lathes combined. Obviously, any success in carbide application to these spindles would greatly enhance the market for carbides.

The bearing races in the photograph are machined from SAE 52100 steel tubing. Outside diameter is 2¼ inches and the inside diameter is 1½ inches.

Tool Life — Work was run at 519 rpm or 333 sfm. Tool life for the operations were: 724 pieces per grind for internal necking, 1270 for butt facing, 1518 for breaking down for cutoff, 1890 for vertical form and breakdown, 810 for forming, 720 for cutoff and 1270 for reaming.

Carboloy's new steel-cutting grade 370 is being used on all operations; the cutting fluid is Houghton's Antisep All-Purpose Base.

First Reports—Although the development program is still in initial stages, some conclusions already have been drawn:

First, the tools, tool posts and the machine must be rigid and vibration-free.

Second, to take best advantage of carbide potential, higher horsepower drives are often called for—the case just cited is done on a machine with a 50-hp motor—and higher speed ranges can be used.

Third, the right carbide grade and tool shape must be used on all operations.

Fourth, a good method of supplying a generous amount of water-based coolant to the cutting areas is a must.

By E. C. KREUTZBERG *Washington Editor*

Critical Facilities List: It May Boost Emergency Planning

SECRETARY OF COMMERCE Sinclair Weeks may soon issue a directive that manufacturers be advised if their plants or products are included in the Federal Critical Industrial Facilities List. He hopes publication of such information will give a lift to the drive to get every industrial firm to shape plans now for maintaining production under enemy attack and for getting back into full production following an attack.

Companies knowing their plants are on that list would be more likely to formulate such plans. Companies not on the list also would be more likely to plan, realizing that in the event of bombing attacks they would be pretty much on their own and would have to dig out as best they could.

What It Is—The Federal Critical Industrial Facilities List is set up by a little-publicized group known as the Industry Evaluation Board. It functions in the Department of Commerce under an executive order. It is composed of representatives of the Departments of Commerce, Defense and Interior; the Atomic Energy Commission; Federal Civil Defense Administration and Office of Defense Mobilization. The Commerce representative is the chairman. Office of Defense Mobilization has notified delegate agencies that for facility security purposes and related programs "IEB provides the one authoritative source in the executive branch of government for the identification of essential products, services and facilities."

The purpose of IEB, according to the official language, "is to identify from among hundreds of thousands of products, services and facilities which constitute the American industrial economy, those relatively few whose importance to the national defense warrants the special considerations needed to assure continued production under emergency conditions." The ratings given to plants are disseminated to the agencies responsible for their security—namely, Department of Defense, Atomic Energy Commission, Department of the Interior, Federal Civil Defense Administration, National Security Council, Office of Defense Mobilization and the Federal Bureau of Investigation.

Metalworking Has Big Share . . .

The board has completed its first identification and rating of essential products and critical facilities "within major portions of a number of broad industries such as petroleum, rubber, pharmaceuticals, machine tools, abrasives, construction equipment, electric power producing equipment, railroad equipment, electrical equipment, electronics, aircraft, technical and scientific instruments and parts, numerous machinery and equipment industries, and basic metals, minerals and materials.

"Within the nonmanufacturing field, the following industries are being, or have been, surveyed: All Class I electric utility systems or pools; petroleum pipelines and gas transmission pipelines; Class I railroads; primary highway systems; inland waterways; other forms of transportation and all types of telecommunication."

A large share of the facilities so far qualifying for security ratings are those which rank as important producers or consumers of metals.

May Be Key to DMS Planning . . .

Of equal importance to industry is the fact that the board's findings are applicable to "matters of priorities, allocations, manpower and finance" and such things as "stockpiling" and "production expansion." It follows that plants with IEB security ratings automatically are due for the most liberal treatment under any future revival of materials and production controls. In other words, IEB ratings will be taken into careful consideration by the Business & Defense Services Administration in planning expansion of the present Defense Materials System to meet a possible future emergency.

Until these findings are on a more or less complete basis, BDSA will continue its search for ways of devising mobilization controls for smoother operation, with less paper work for the government and industry. Much can be done in this direction.

Room for Improvement

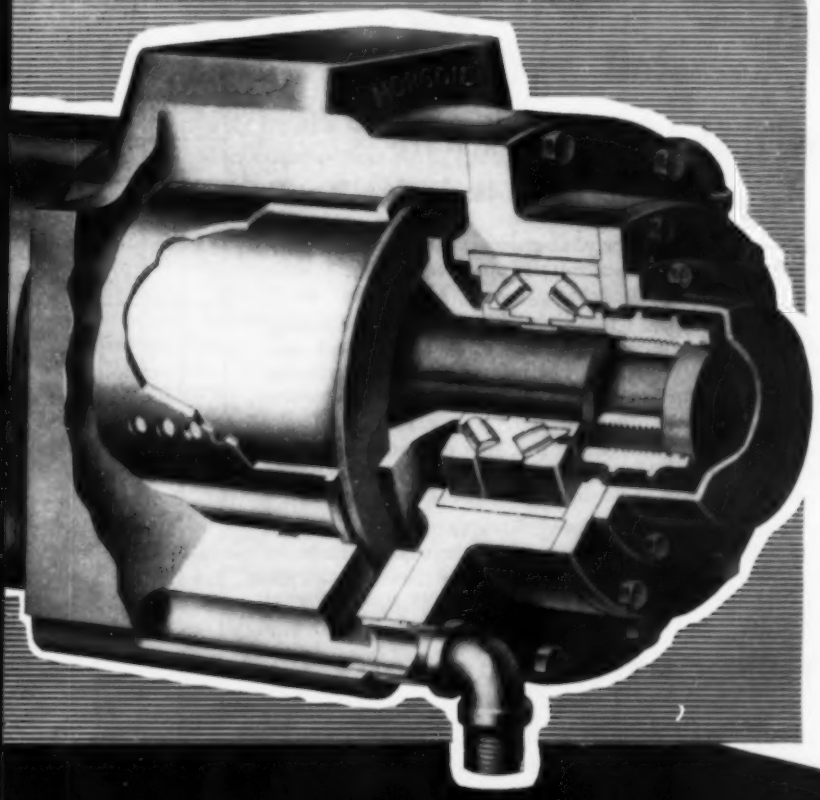
UNDER CMP, every consumer originally had to file CMP Form 4-B to get controlled materials. That made a terrific workload. Two remedies were applied. Small consumers were allowed to order limited quantities under the SU (small user) symbol without filing 4-B paper. Later, intermediate-size consumers were enabled to obtain controlled materials within certain quantity limits through self-certification without filing 4-Bs. That eliminated some 80 per cent of the paper work by keeping under the 4-B burden the 20 per cent of consumers who used 80 per cent of the steel, copper and aluminum.

Paper work could be cut a lot more, it is believed, by making over-all allotments to prime contractors or pools, to take care of all subcontractors and sub-subs, with the reporting task in each case concentrated in one place.

Morgoil Adopts Aluminum Alloy

IN 1935, Morgan Construction Company, ever on the alert for improvements in roll neck bearings, was a pioneer in the use of cadmium nickel alloys to replace babbitt as the bearing metal in MORGOIL Bearings.

World War II interrupted our research program but **IN 1946** we turned our attention to aluminum alloy bearing metals. For six years we carried on an extensive investigation in co-operation with the Research and Development Division of the Aluminum Company of America. Aluminum alloy bushings were tested in MORGOIL Bearings on all types of 2-high and 4-high mills in the plants of many of our customers and have definitely proved their superiority under the most grueling of operating conditions. **IN 1952** our production of bushings was changed to the aluminum alloy type. We are confident that this marked another important milestone in the development of the most rugged, most dependable and most economical roll neck bearing — MORGOIL.



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MORGAN CONSTRUCTION CO.

WORCESTER, MASSACHUSETTS

ROLLING MILLS - MORGOIL BEARINGS
WIRE MILLS · GAS PRODUCERS · AIR EJECTORS
REGENERATIVE FURNACE CONTROL

English Representative: International Construction Company, Ltd.
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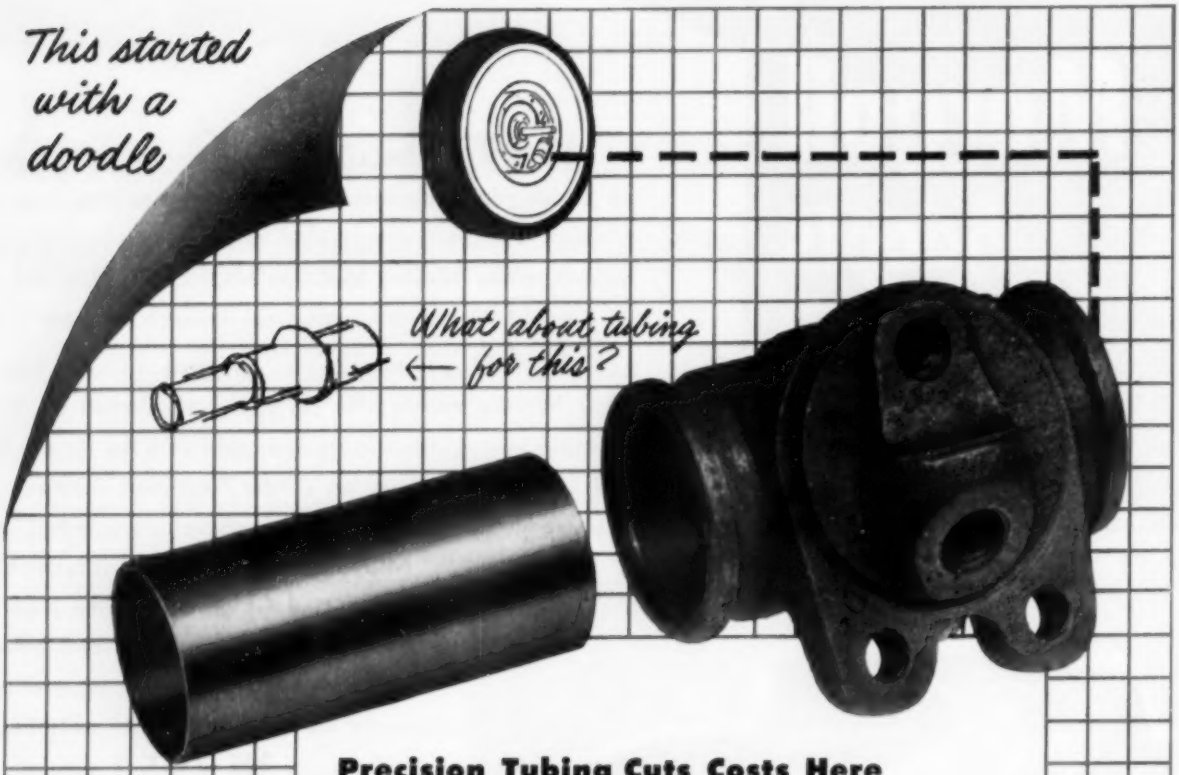
MORGOIL
ROLL NECK BEARINGS



Precision Tubing Cuts Costs Here —What Can it do for You?

IT'S POSSIBLE to save money for your company and make a better product at the same time when you use precision tubing. Specifically, Republic ELECTRUNITE Tubing.

Autoline Supply Company of Chicago does it this way. The tubing they use for sleeving brake cylinders has to have a smooth surface. No pit marks. No scratches. The tolerance on a 1" cylinder is three and a half thousandths. If the tubing isn't smooth, it means an expensive honing operation.

By using Republic ELECTRUNITE Tubing, this operation is eliminated. So is tubing scrapped because of imperfect surface finish. Cylinders perform the way they should. Costs are kept down.

Does this give you an idea for using ELECTRUNITE Tubing in your products to cut material costs, speed production, or turn out better parts? Our engineers will be glad to help you take advantage of this precision tubing in either carbon or stainless steel analyses. Write to:

REPUBLIC STEEL CORPORATION
Steel and Tubes Division
253 E. 131st Street, Cleveland 8, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

REPUBLIC STEEL

REPUBLIC ELECTRUNITE TUBING

Wide World

WHO SPENDS FOR EUROPE'S DEFENSE?

	Per cent of gross national product			Per cent of total government expenditures		
	1952	1953	1954	1952	1953	1954
Belgium-Luxembourg	4.7	5.9	6.6	18.6	21.7	23.9
Denmark	2.5	2.9	3.9	17.9	19.6	26.0
France	8.8	10.5	10.4	33.4	37.7	36.8
Germany	6.9	6.4	6.0	25.4	22.7	21.2
Greece	7.9	7.1	7.1	34.7	32.1	30.2
Italy	4.9	4.6	4.5	23.7	20.6	20.5
Netherlands	5.3	5.3	6.7	21.4	20.0	24.7
Norway	3.5	4.7	5.2	19.8	25.0	27.3
Portugal	3.0	3.7	4.0	27.0	31.5	33.3
Spain	3.9	4.1	4.3	38.8	37.5	35.1
Turkey	6.2	6.2	6.9	40.2	40.0	40.0
United Kingdom	9.8	11.0	10.6	31.5	35.5	36.9
Yugoslavia	16.7	18.5	16.2	77.9	79.6	80.0
NATO plus Germany	7.5	8.3	8.2			
United States	12.8	13.8	13.2	66.3	67.3	67.8

Source: Council of State Chambers of Commerce, based on Foreign Operations Administration data.

Can Europe Afford More Defense?

A study by the Council of State Chambers of Commerce indicates Europe can now afford to take on more of its own defense efforts. Industrial recovery is cited

MAJOR PREMISE for much of the U. S. dollar aid to European countries has been that those countries are willing but unable to finance their own fight against Communism.

A study by the Council of State Chambers of Commerce questions whether that premise is any longer sound in view of the industrial recovery in Europe since World War II.

Plus Factor—The table above shows the U. S. spends more for defense purposes as a percentage of its gross national product and as a percentage of its total government expenditures than any major non-Communist European country, except Yugoslavia. The U. S. percentage of GNP going for defense is all the more impressive when the rise in the GNP since 1949 is considered.

The index of gross national product of the U. S. rose from 82 in 1948 to 102 in 1953, according to statistics submitted to Congress by the Foreign Operations Administration. The index of gross national product of the European countries concerned rose as follows during the same period: Belgium-Luxembourg, 91 to 101; Denmark, 90 to 102; France, 90 to 99; Germany, 85 to 104; Greece, 86 to 106; Italy, 80 to 105; Norway, 89 to 101; Portugal, 80 to 102; Spain, 68 to 99; Turkey, 61 to 103; United Kingdom, 92 to 102 and the total for all North Atlantic Treaty Organization countries plus West Germany, 84 to 102.

What It Means—Thus Western European countries, while accomplishing rises in gross national product comparable to that of the U. S., are still not committing nearly the share of their GNP to defense as the U. S. is.

"The general economic improvement in Western Europe since 1949 indicates," says the CSCC, "that it is appropriate to look again at the ability of these countries to provide a larger share of their own resources for defense."

Ready but Unwilling?—As to whether European countries are *willing* to shoulder a bigger share of their defense loads, the CSCC study cites failure of the French and Italian governments to ratify the European Defense Community agreement and the general performance of our allies, excepting Turkey, in the Korean war. Those performances raise a real doubt that, even though impressive military machines are built, some of our allies in Europe may not be willing to use them.

Timeliness of the CSCC study stems from congressional study of foreign aid appropriations for fiscal 1955. While the House has approved a $3.3-billion aid bill, there is still House-Senate action required on the actual ceilings on amounts of money that can be spent for the various purposes outlined in the bill. There's still opportunity for plenty of study of the problem before a final decision is reached on what the 1955 installment of foreign aid will be.

More Power for Korea

Foreign Operations Administration has authorized $30 million for building three new thermal electric power plants in Korea.

These plants will add 100,000 kilowatts to Korea's power supply.

The $30 million authorized by FOA will finance the estimated dollar costs of a contract negotiated between the Korean government and the Pacific Bechtel Corp.

Pacific Bechtel will design and construct the plants and train Koreans to operate them.

Clark Equipment Co.

SERVICE SCHOOL TIPS

1. Keep classes small and informal.

2. If you're planning a new school, work out to exact detail what you expect to accomplish. Then develop courses for that specific purpose.

3. Make sure that you have adequate quarters—classroom for lectures and discussions away from shop noise; a school shop fully equipped with modern tools and machines which are not to be used in normal production operations.

4. Maintain a serious "you're here to learn" attitude among students. Careful selection of competent instructors is the key.

5. When setting up classes, try to group students with similar background and experience. This will facilitate instruction and permit a certain amount of flexibility in planning what emphasis to place on various subjects covered.

Service Schools Pay Off in Satisfaction

Teach your customers to use and maintain your equipment properly and your sales curve should go up in new sales, repeat sales and parts sales

"NO WONDER it won't work. Somebody tried to repair it with this ABC unit—it just wasn't built to operate in our equipment."

More and more companies are starting service schools to eliminate that type of situation. They're helping to overcome customer dissatisfaction from delays in having to send equipment back to the company for repairs and from having poor and even damaging repairs done by unqualified servicemen.

Made-to-Measure—You can set up a service school to train your employees, your customers, or private concerns who serve your customers. The school should be tailored to your individual operation, but the end result is the same—your equipment will be properly serviced to insure the maximum customer satisfaction possible.

Lincoln Electric Co., Cleveland welding equipment producer, set up an authorized Field Service Shop organization six years ago. It signed only established private electrical repair concerns which had to agree to send at least one representative to Lincoln Electric's service school. Today, Lincoln Electric has over 200 authorized field service shops; the average shop has sent two men to the school.

Free Instruction — Lincoln Electric's basic course lasts two weeks. The training is provided free, but the students or the firm they represent must pay for their hotel and living expenses while in Cleveland. The company also has a five-day refresher course which is designed for management men and for graduates of the basic course.

White Motor Co., Cleveland, has a maintenance - management program designed for truck fleet maintenance supervisors. 1. It underwrites a special foundation at Pennsylvania State University which provides five-day courses at various colleges across the nation for all motor fleet supervisors. 2. It operates a shop course at its Cleveland factory. 3. It has service engineers on the road constantly who assist fleet operators in setting up informal service courses on a local level.

The Setup—The college courses are open to anyone in the truck industry, and the curriculum is based upon recommendations by the National Advisory Committee for Motor Fleet Supervisor Training. The shop course is open to customers and White employees, with the split being about fifty-fifty since the course was instituted about a year ago.

Another type of service school is that provided by Clark Equipment Co., materials handling equipment and auto components maker. Clark has a mobile service school with which it can offer service maintenance training in the customer's "back yard." Equipment for the school is transported from stop to stop in a specially constructed tractor-trailer unit driven by a two-man, instructor-and-assistant team. During the first two years of the school's operation, Clark expects attendance to go over the 5000 mark. The unit will travel 20,000 to 25,000 miles.

The End Use—Pure and simple, service schools are a sales tool. They will help sell new equipment; they will help get repeat sales; they will help sell parts.

All photographs: USSteel News

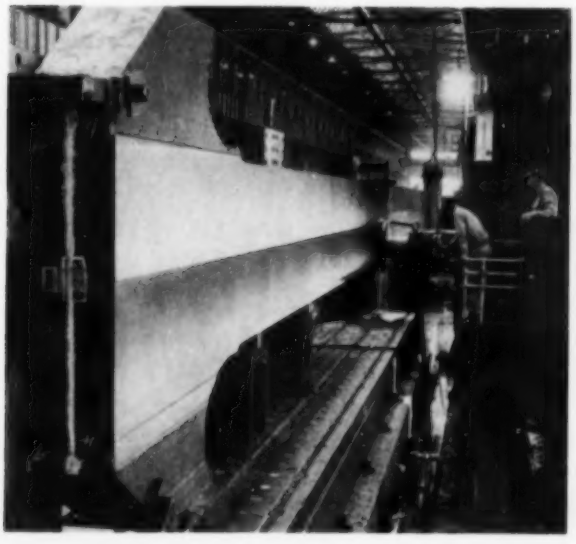
ACCENT ON OVERSIZE

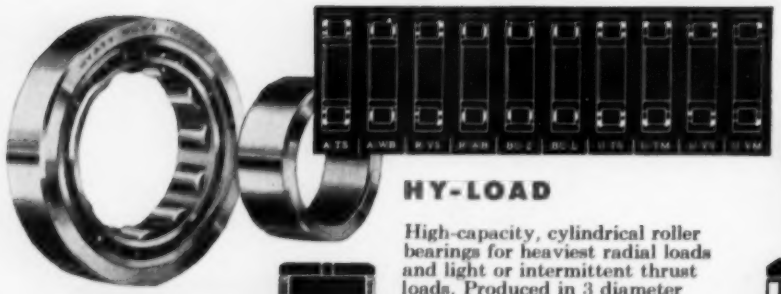
KING-SIZE JOBS are usually no novelty to U. S. Steel Corp., but at the Charleston Naval Ordnance Plant, South Charleston, W. Va., that company is tackling a whopper: Machining 110-foot-long forgings (above and left below).

The forgings, produced by Bethlehem Steel Co., weigh 142.5 tons each before machining, 105 tons afterward. Eighteen of them will be assembled in groups of three to make columns for a 50,000-ton forging press for the Air Force's heavy press program.

The huge steel casting which U. S. Steel is machining and heat treating at the same plant (below right) will form the lower crosshead beam of another 35,000-ton press for the U. S. Air Force. It was cast in Sheffield, England, and weighs 170 tons.

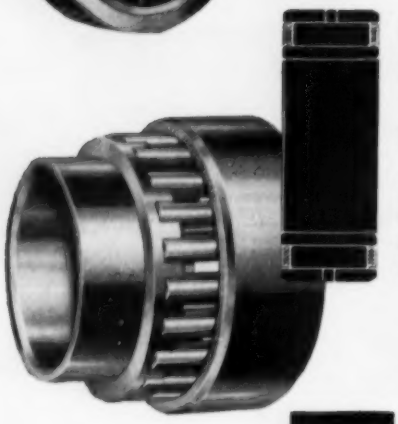
Both presses are being erected by the Loewy Construction Co. Inc., New York, at the Wyman-Gordon Co. plant, North Grafton, Mass.





HY-LOAD

High-capacity, cylindrical roller bearings for heaviest radial loads and light or intermittent thrust loads. Produced in 3 diameter series, 2 widths and more than 800 sizes.



INDUSTRIAL INCH

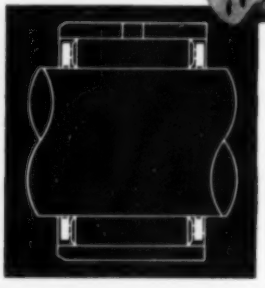
Designed for slow-moving, heavily loaded machinery where large-diameter shafts are the rule. Accordingly, it is available in fractional-size bores for shafts from 4" in diameter upwards.

WOUND ROLLER

This is a three-part separable bearing available in various width classifications. The roller construction provides maximum resistance to shock, abrasion and fatigue.

BARREL

A series of angular-contact, self-aligning bearings capable of sustaining both radial and thrust loads. Race and roller curvatures insure ideal distribution of load, not only for normal operation but also for conditions of misalignment.



TRUNNIONED ROLLER

Ideal for industrial trucks, textile machinery, gear pumps, conveyors, hoists and agricultural equipment. Rollers have trunnioned ends which fit into holes in the end rings. End rings are located and held parallel by spacing bars which also guide and retain rollers.

DESIGNED FOR HEAVY DUTY...

HYATT ROLLER BEARINGS

...and there's a type and size for every need

Hyatt's complete line of radial and angular-contact bearings—*more than 800 sizes in the Hy-Load series alone*—makes the engineers' job easier, because it makes possible greater design flexibility. For the equipment *buyer*, this means longer bearing life and lower maintenance costs—with just the right bearings designed into every vital load-carrying position.

The next time you buy new equipment, or make a changeover, *specify lower maintenance costs by specifying Hyatt Bearings!* And if you need technical help in your selection of bearings, or desire information about particular bearings or their applications, ask for the services of a Hyatt sales-engineer. Call or write Hyatt Bearings Division, General Motors Corp., Harrison, N. J.

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION

GM in California Turns Up Tricks It Can Use in Michigan

LOS ANGELES

LOS ANGELES, perhaps even more than Detroit, typifies modern automobilism and the drive-in culture pattern.

In Los Angeles county there are more cars registered than in 42 of the 48 states. The city of Los Angeles has the highest per capita auto registration of any city in the world, and more different makes of car are made in Los Angeles than in any other city in the world.

Just a Start — An interesting thing about some natives of this region is that they often feel a car as it comes from the dealer is in kit form, so to speak. From this point they commence to chop, channel, dechrome, lead and hop-up until the car is more adapted to the norm of the culture pattern. It is here in Los Angeles that lowering blocks will first become standard equipment and that dual exhausts first echoed the note since heard in Detroit.

And it is in this peculiar auto ethnic group that there dwells an auto plant by the appropriate name of BOP.

Assembly Economies — Standing for Buick, Oldsmobile, Pontiac Assembly Division of General Motors Corp., this plant was the first of the division which now includes seven plants. The function of these plants, as may be inferred by the name, is to build Buick, Oldsmobile, and Pontiac automobiles. In the case of these "middle-volume" cars, such a grouping makes possible economies of assembly that would not be possible in assembling the makes at different plants. Cadillac is not included because its volume is too small, and Chevrolet is left out because its volume is too large.

When you're used to seeing these makes of car coming down lines of their own in Flint, Lansing and Pontiac, the sight of all three coming off the same line can't help but leave you with the feeling somebody has goofed. But when they keep coming smoothly and you realize there are millions of possible combinations that can be made on the one line, you begin to appreciate the tremendous scheduling job behind the BOP operation.

Precision — To assemble, you must have the right parts in the right place at the right time. This plant draws upon about 60 plants in 14 states for its parts and there are continually 400 box cars in transit to keep the plant assembling at the rate of a car a minute. When you consider the fact that some items like upholstery must be ordered as much as six months in advance of the date the car is to come off the line, the importance of correctly anticipating demand patterns can be understood.

Yet it should be emphasized that every car built in the South Gate plant is built to a specific dealer order. The orders are allocated against a master mix determined by the availability of materials and capacity established on the basis of demand forecast. This whole deal requires a high combination of scientific guesswork fundamental to the efficiency of the plant which can better be appreciated than understood.

How It's Done — Walking down the assembly line controlled by 46 telaudographs the visitor gets an impression of tremendous flexibility with precise control. Frames of Buick, Olds or Pontiac start out in whatever order is required traveling sideways on a conveyor with bins of chassis components for all three makes available as required. A short distance down the line is a caster, camber and toe-in adjuster which clamps the front suspension of Pontiacs pneumatically and shows red lights until adjustments are correct. Since these adjust-

Goodyear Tire & Rubber

Over Hill, Over Dale, It Will Hit the Liquid Trail

A vehicle that made history for the Gulf Oil Corp. is getting a chance to see what it can do for the U. S. Army. Latest version of the famous "Marsh Buggies" which Gulf has used for oil exploration in coastal swamps for 17 years is specially designed for military use. An enclosed cab holds 20 persons, tires are self-inflating, and the buggy hauls a one-ton capacity trailer

ments are set at the source for Buicks and Oldsmobiles, the fixture is not required for these makes.

One fixture that is used on all three makes, however, is the body-shimming fixture. By rotating two rails along the sides of the fixture, the proper set of micrometers for any chassis is placed in position eliminating two extra fixtures and two stations. So vital is this device that a spare is kept on hand at all times.

About an hour and a half after the frame is placed on the line it meets a body which has traveled over three miles in the plant and has been about 18 hours in the making. The body operation at the BOP plant is a special story in itself well worth a closer look.

Body Story — Unlike plants of other divisions, the Fisher Body end of the BOP plant is operated by the assembly plant manager directly. Using Fisher Body tools and components, the bodies are assembled to co-ordinate with the mix schedule of the assembly line. And with Buick and Olds changing bodies this year while Pontiac remained the same, considerable planning was required to maintain smooth operations, resulting in two body shops in the one plant.

Buick and Oldsmobile bodies are built by the new side-framing method. As plant manager Henry Clark explains it, "We're actually building close-tolerance openings surrounded by sheet metal." With this new technique, floor pans start down the line and are met by right and left side fixtures traveling down an overhead assembly line. Into these fixtures have been assembled the rear quarter panel, upper and lower side rails and center posts which are then turned around automatically and lowered into position on the body dolly. While the side-framing fixture is still clamped in position, the roof panel is dropped by an overhead conveyor, clamped and spot welded.

Ingenuity—The result is a rigid unit which can then continue on through further welding, leading and painting steps on its own while the side frames are returned to be rescheduled into the operation. The side frames are kept in a bank. Through more frequent rescheduling it is possible, in effect, to vary the tooling—limited only by how fast the frame can make its circuit.

An innovation at the plant is the technique of adding the seats and side upholstery panels after the car has been driven off the line and given a water test. In this way upholstery cleaning that adds cost in many plants is avoided. The move is spreading in the industry.

Innovator—There are many other interesting facets of the BOP South Gate operation like the fact that, in the event of floods, wrecks or lost box cars, flying material in is much cheaper than stopping the line. In January of this year, over 550,000 pounds of material was air freighted to South Gate.

But South Gate BOP is best summed up as 22 acres of the right part in the right place at the right time.

Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	676,233	782,491
May	621,249	684,843
June	623,732†	713,778
July		757,595
August		641,152
September		605,228
October		651,153
November		457,852
December		529,588
Total		7,817,846

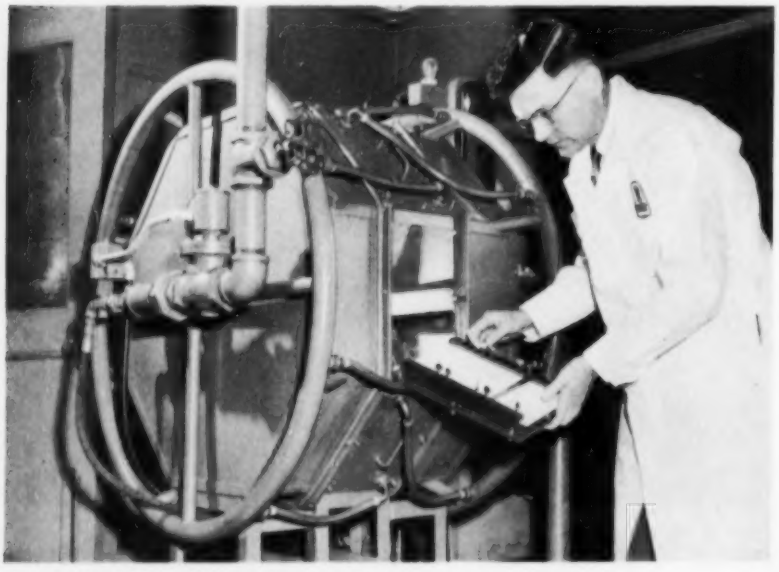
Week Ended	1954	1953
June 19	141,878	170,357
June 26	140,695	173,702
July 3	133,141	140,724
July 10	106,169	167,560
July 17	131,163	175,599
July 24	123,000	172,874

Source: Ward's Automotive Reports. †Preliminary. *Estimated by STEEL.

Chrysler Exports Rise

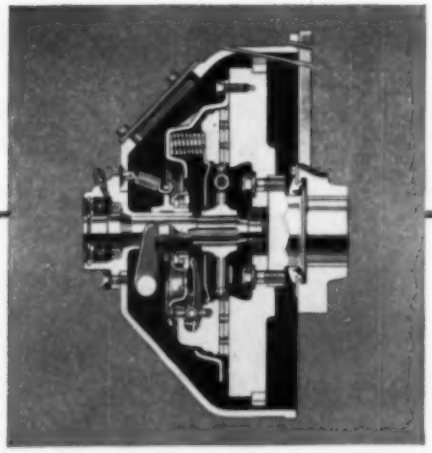
Exports of Chrysler Corp. passenger cars and trucks during the first five months of 1954 increased 21.3 per cent over the comparable period in 1953, says C. B. Thomas, president of Chrysler's Export Division. The auto industry as a whole increased exports 14.5 per cent in cars and trucks during the same period according to Automobile Manufacturers Association.

Chrysler truck export sales jumped 30.8 per cent, compared with 28.1 per cent for the industry; Chrysler car export sales climbed 15.8 per cent, compared with 4.9 per cent for the industry.



Rough Weather in a Box

In two weeks, automobile paint samples placed in this device get a weathering equivalent to five months in the open air. General Motors Research Laboratories where it is in use calls it "Little Florida." A 1200-watt mercury arc lamp which gives the hot sun treatment is aided in its dirty work by artificial dew



Cutaway shows New Departure **ball** bearing application in the clutch shaft and pilot positions.

Another **NEW** Tractor Calls for **NEW DEPARTURES**

In the Massey-Harris "44 Special" tractor, you'll find New Departures at work . . . in the generator, clutch shaft, clutch pilot, power take-off and belt pulley drives.

Throughout the farm field, New Departures have proved themselves. They carry thrust, radial or combined loads . . . support moving parts with rigid accuracy . . . allow simple, rugged designs. Above all, New Departure **ball** bearings mean longest life with lowest possible upkeep costs.

So when you design for the farm, *talk with your New Departure engineer.*

NOTHING ROLLS LIKE A BALL

NEW DEPARTURE

BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS BRISTOL, CONNECTICUT
Plants also in Meriden, Connecticut, and Sandusky, Ohio
In Canada: McKinnon Industries, Ltd., St. Catharines, Ontario

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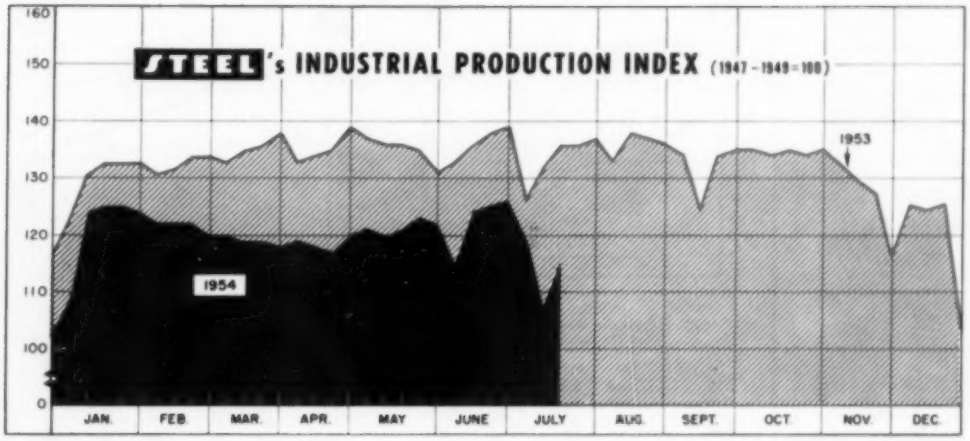
You're assured of the highest internal quality with Timken seamless tubing. The piercing process by which it's made is basically a forging process. It has a uniform spiral grain flow for greater strength, and a refined grain structure which brings out the best quality of the metal. And the Timken Company's rigid quality control keeps this quality uniform from tube to tube and heat to heat. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD — THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



LATEST WEEK*	115
PREVIOUS WEEK	107
MONTH AGO	124
YEAR AGO	136

* Week ended July 19.

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%.

Show of Confidence: Bills Are Being Paid Promptly

PROMPT PAYMENT of obligations is more than ever the rule for most businesses. The same holds true for consumers.

Bills are being either discounted or paid when due by 87.3 per cent of manufacturing accounts, according to Credit Research Foundation of the National Association of Credit Men. In February (the previous survey) the percentage was 85.6 per cent.

Down from Last Year—A year ago, though, the percentage of prompt payers was even higher; 87.8 per cent were settling their obligations in accordance with suppliers' terms.

Retail accounts are also improving. Credit Research's data show that 81 per cent are in the discount or prompt category compared to 79.8 per cent in February. In May, 1953, the percentage was 81.4 per cent.

Wholesalers Steady — Wholesale accounts have held about steady, down only .1 per cent from February's 84.8 per cent. A year ago the figure was 86.2 per cent.

The generally improved situation is a reflection of the brightening industrial picture and the over-all confidence of both business and consumers.

High Spending—High consumer spending ($14.5 billion in June) looks like it will continue through the summer. Most of 1954 monthly totals have been only a few percentage points behind year-ago levels.

This high spending is in spite of consumer prices which are now at record levels. The purchasing power of the dollar is down to 53.9 cents, lowest point in the 47-year history of the National Industrial Conference Board's consumer price index.

Credit Going Up — Consumer credit has been falling from its $29-billion peak of late last year, but it's on its way back up again. The "low" point in the dip was about $27 billion in April. Rising

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Producton (1000 net tons)[2]	1,573	1,534	2,128
Electric Power Distributed (million kwhr)	8,420[1]	8,185	8,209
Bitum. Coal Output (daily av.—1000 tons)	892	237	1,142
Petroleum Production (daily av.—1000 bbl)	6,325[1]	6,281	6,551
Construction Volume (ENR—millions)	$431.1	$298.5	$191.6
Automobile, Truck Output (Ward's—units)	131,163	106,169	175,599
TRADE			
Freight Car Loadings (unit—1000 cars)	625[1]	570	791
Business Failures (Dun & Bradstreet, no.)	189[1]	196	148
Currency in Circulation (millions)[3]	$29,981	$30,154	$30,163
Dept. Store Sales (changes from year ago)[3]	−16%	+18%	+11%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,247	$16,570	$15,932
Federal Gross Debt (billions)	$271.0	$271.2	$272.4
Bond Volume, NYSE (millions)	$22.4	$16.2	$12.4
Stocks Sales, NYSE (thousands of shares)	12,826	9,256	4,628
Loans and Investments (billions)[4]	$81.1	$81.1	$76.1
U. S. Gov't. Obligations Held (billions)[4]	$33.6	$33.7	$29.3
PRICES			
STEEL's Finished Steel Price Index[5]	194.15	192.47	189.18
STEEL's Nonferrous Metal Price Index[6]	215.6	215.8	205.8
All Commodities[7]	110.2	110.0	110.5
Commodities Other Than Farm & Foods[7]	114.2	114.2	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,384,549. 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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CAN SKYROCKET WELDING COSTS

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moisture content with
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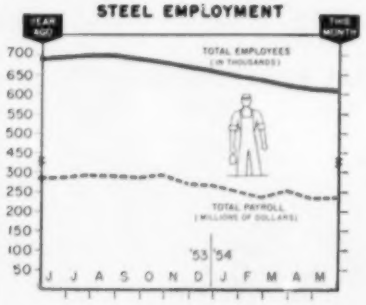
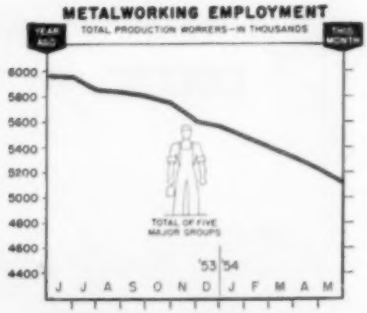
THE BUSINESS TREND



	Employment in Thousands		Payroll in Millions	
	1954	1953	1954	1953
Jan.	645	685	$251.3	$261.3
Feb.	636	685	236.6	261.3
Mar.	621	683	249.7	281.0
Apr.	609	685	232.6	278.0
May	606	685	234.4	281.0
June	...	690	....	282.1
July	...	696	....	288.1
Aug.	...	696	....	287.3
Sept.	...	688	....	283.8
Oct.	...	678	....	290.6
Nov.	...	667	....	268.5
Dec.	...	656	....	263.9

American Iron & Steel Institute.



Production Workers—Five Major Groups In Thousands

1953	Prim. Mtls.	Fab. Prod.	Mach. inery	Elec. Mchy.	Trans. Equip.
May	1,146	949	1,335	946	1,580
June	1,153	953	1,330	937	1,573
July	1,143	934	1,295	918	1,559
Aug.	1,138	942	1,268	932	1,547
Sept.	1,129	939	1,262	941	1,520
Oct.	1,112	924	1,254	933	1,507
Nov.	1,088	902	1,240	913	1,449
Dec.	1,074	875	1,238	883	1,487
1954					
Jan.	1,049	874	1,230	855	1,470
Feb.	1,027	864	1,220	839	1,435
Mar.	1,010	852	1,202	827	1,409
Apr.*	992	839	1,187	811	1,381
May*	977	824	1,166	788	1,352

* Preliminary.
U. S. Bureau of Labor Statistics.

Charts Copyright 1954 STEEL.

automobile sales and a leveling off in appliance sales are important figures in the pickup.

Output of both durable and nondurable goods on an average are holding steady with civilian production making up for the continuing drop in defense orders. The Federal Reserve Board industrial production index in both May and June was 124. In July it will probably drop because of the general decline in output resulting from a holiday weekend, strikes and plant vacations.

Slow Pickup for Steel . . .

Steel producers expect the summer lag in demand to continue through August. Operations have bounced back to 64.5 per cent of capacity from the low 59.5 per cent registered in the July 10 week which included the Independence holiday, but further improvement is not expected soon. In fact, steel output is liable to drop even further as a result of curtailments planned in Pittsburgh and Youngstown.

Some observers are confident the industry's final-half production will approximate the 44,100,000 tons of the first six months. But others contend it will take a better fourth quarter than now appears in sight to make up for the slow third quarter.

Better TV Picture Ahead . . .

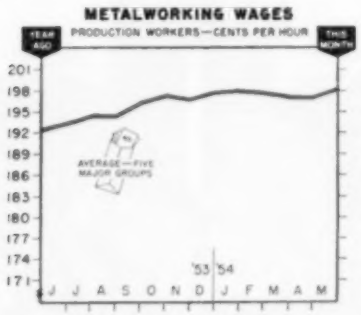
Television set sales have been in a slide since late last year, Federal Reserve Board figures show. But, even so, sales are running ahead of a year ago, says Radio-Electronics-Television Mfrs. Association.

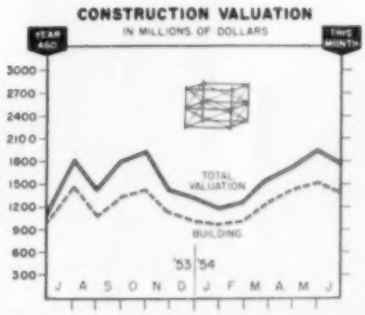
Television sales traditionally run contrary to the thermometer, so with the first autumn chill sales should start climbing again. Lower-priced, bigger-tube color sets should add to the fall upswing.

Auto Sales Stay High . . .

Continuing high sales are in prospect for the automotive industry. New car sales in June were 560,000 units, highest in 47 months; used car sales held up too, with 834,000 vehicles purchased. Now, for the first 10 days of July, Chrysler and Lincoln-Mercury division of Ford Motor Co. report record sales.

Chrysler dealers sold 3086 cars for the best ten days since introduction of the 1954 model. This is a continuation of a pickup in Chrysler sales that began about a





(cents per hour)

Production Workers—Five Major Groups

	Prim. Mtls.	Fab. Prod.	Mach. Inery	Elec. Mchy.	Trans. Equip.
1953					
May	202	183	195	174	205
June	205	184	195	175	207
July	209	185	195	176	207
Aug.	208	185	196	177	206
Sept.	212	186	198	178	207
Oct.	208	187	199	177	209
Nov.	208	187	199	179	210
Dec.	208	188	200	180	211
1954					
Jan.	208	189	200	180	212
Feb.	206	189	200	180	212
Mar.	206	188	200	180	211
Apr.*	206	188	200	180	211
May*	207	189	200	181	212

* Preliminary.
U. S. Bureau of Labor Statistics.

(37 States)—In Millions of Dollars

	Total		Building	
	1954	1953	1954	1953
Jan.	1,151.9	1,075.9	935.6	876.0
Feb.	1,221.3	1,021.3	977.5	792.9
Mar.	1,527.5	1,374.5	1,199.8	1,054.4
Apr.	1,691.9	1,741.5	1,401.6	1,354.2
May	1,925.3	1,606.1	1,497.6	1,219.8
June	1,733.3	1,115.5	1,376.7	922.3
July	.....	1,793.3	.....	1,417.8
Aug.	.....	1,414.4	.....	1,053.4
Sept.	.....	1,741.7	.....	1,290.7
Oct.	.....	1,892.4	.....	1,392.7
Nov.	.....	1,394.1	.....	1,096.0
Dec.	.....	1,279.8	.....	973.8
Total	.....	17,423.5	.....	13,455.0

F. W. Dodge Corp.

month ago, says E. M. Braden, Chrysler general sales manager.

Mercury dealers sold 10,312 cars in the first 10 days of July compared with 6268 a year ago. That total topped any first-10-day period since May, 1950, according to J. E. Bayne, Lincoln - Mercury general sales manager. Retail deliveries of Lincolns were 1352 against 1270 a year ago; this is the highest for the first 10 days of a month since June of last year.

Lower Output Helps Dealers . . .

The industrywide picture is one of reduced production to help dealers cut their inventories before new models come out, which may be earlier than was the case a year ago. The industry wants to avoid the distress sales and resulting slim dealer profits of a year ago.

So far in 1954 output is closer to sales: First-half production was only 5 per cent ahead of retail deliveries compared with a 9-per-cent excess in the same period of 1953.

Petroleum Refining Cut Back . . .

With high car sales there should be an all-time high in demand for gasoline, the more so right now because summer is generally the period of highest consumption. But the trouble is that as good as demand is, supply is even better. So numerous producers are cutting both production and prices.

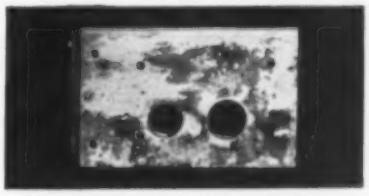
The price of gas for the family buggy won't go down very far though. The cut in refining operations has already been reflected in a rise in wholesale prices on the Gulf coast, wiping out recent price dips.

Trends Fore and Aft . . .

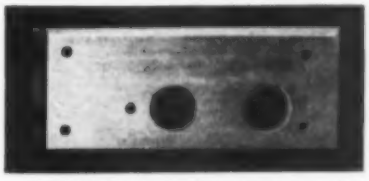
The decline in sales of major appliances seems to be leveling off, reports Federal Reserve Bank of Cleveland. . . A big jump in federal construction contract awards helped boost total awards for the week ended July 15 to $431 million, the second highest weekly total in 1954, according to *Engineering News-Record*. . . American Appraisal Co. construction cost index rose 3 points in second quarter, 1954; the net rise since the first of the year is 4 points. Wage and fringe benefit increases account for the jump. . . Power steering will be installed in 1 million cars this year if present rate of installation continues, says *Ward's Automotive Reports*. That would make about 2 million cars equipped since 1951.

How Diebold, Inc.

keeps their SAFES SAFE from rust



This part from a Diebold safe door was covered with fingerprint neutralizer, then spotted with synthetic perspiration. In a matter of days destructive rust was apparent.



This Diebold safe door part was spotted with synthetic perspiration, covered with fingerprint neutralizer, then wrapped with Marvellum VPI. At the end of the test there was no indication of rust. The part was in the same excellent condition as the day it was made.

with MARVELLUM vpi WRAP

No wonder, after the tests shown above, Diebold Inc. chose Marvellum VPI® Wrap to protect their safes from rust. All ferrous metal parts are now kept wrapped from the moment they are made and each safe . . . large or small . . . is protected by Marvellum VPI before and during shipment. A special coating on the VPI paper vaporizes . . . forms an invisible protective film that positively prevents rust.

Marvellum VPI is easy to use . . . just fold the paper over the part. No need for time-consuming slushing or greasing. No mess or costly cleaning when the item is unwrapped. It's bright and clean, ready for immediate use.

You'll find many uses for Marvellum VPI in your plant . . . wrap steel parts, protect inventories, line tote boxes.

Marvellum VPI is available in rolls of 20, 30, 40 and 60 lb. paper stock and *can be individually imprinted with your trademark* on quantity orders. Envelopes, sheets, bags, shrouds and tubes are also available.

Marvellum V P I Wrap is made in compliance with Military Packaging Specification MIL-P-3420.

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Ohio Rolls

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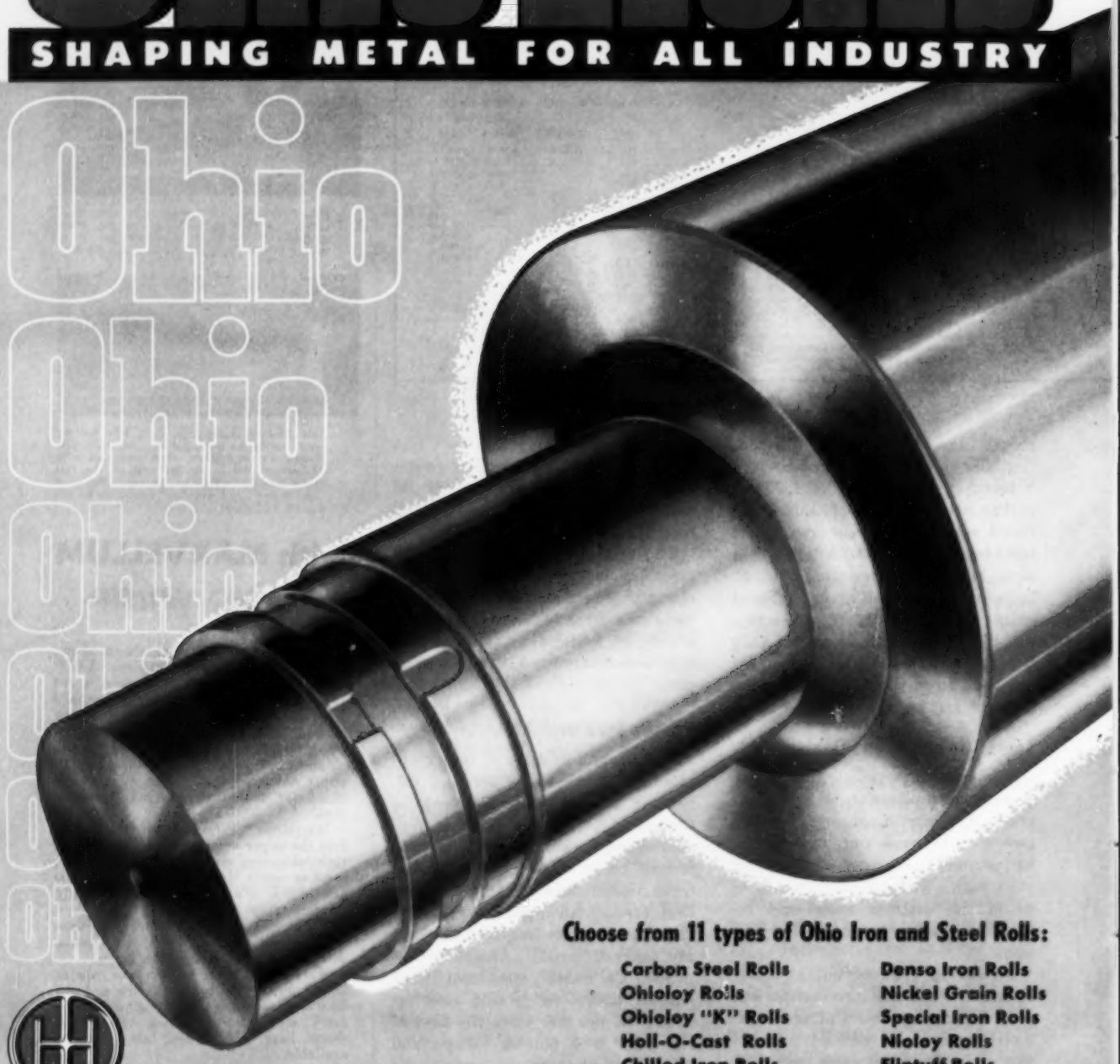

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Carbon Steel Rolls	Denso Iron Rolls
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Holl-O-Cast Rolls	Nioloy Rolls
Chilled Iron Rolls	Flintuff Rolls

Ohio Double-Pour Rolls

THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO — **Plants at Lima and Springfield, Ohio**

P. L. CODDINGTON
. . . Carpenter Alloy Tube Div. mgr.

P. L. Coddington is manager of Carpenter Steel Co.'s **Alloy Tube Division**, Union, N. J., where, since 1953, he has served as assistant to the president. Prior to this he was sales manager for the division.

Black & Decker Mfg. Co., Towson, Md., elected **R. G. Horner** vice president-sales planning; **Adam Quick** vice president-production; and **J. F. Spaulding** vice president-general sales manager.

Taylor Forge & Pipe Works, Chicago, appointed **George Saum** manager, Taylor Forge Aircraft Products Division. **T. E. Marston** becomes general sales manager of the division.

Mechanical Industries Inc., Pittsburgh, appointed **D. L. Edmunds** chief engineer. He joined U. S. Steel Corp. in 1951 to serve as a design engineer for piping in connection with construction of the Fairless Works. More recently he did general design work on U. S. Steel's research center at Monroeville, Pa.

The following have joined the staff of **Metals Research Laboratories**, Niagara Falls, N. Y., a division of Union Carbide & Carbon Corp.: **Frank W. Hurd, John P. Frenck, William A. Krivsky, Darwin Marshall, Robert Peterson** and **James E. Wells.**

At **Firth Sterling Inc.s** carbide division, Pittsburgh, **M. L. Backstrom** was promoted to assistant sales manager. He is succeeded as chief engineer by **W. E. Montgomery. John Gabrenas** was named assistant chief engineer.

Chicago Bridge & Iron Co., Chicago, appointed **Fred L. Goldsby** general sales manager, **George S. Trees** assistant general sales manager and **Robert P. Davies** export manager with headquarters in New York. **Lewis McDonald**, vice president and assistant to the chairman, retired.

Jack H. Walters, Houston district sales manager of **Rockwell Mfg. Co.'s** meter and valve division, was named gas products manager for the entire division with headquarters at Pittsburgh. He is replaced at Houston by **Thomas I. Stacy.**

D. E. Knight joined the staff of the general sales department, **Haynes Stellite Co.**, a division of Union Carbide & Carbon Corp. at Kokomo, Ind. He will be concerned primarily with development work on hardfacing materials.

Dorothy M. J. Tracey was elected president of **Tomkins-Johnson Co.**, Jackson, Mich. She succeeds her father, the late **A. R. Johnson.** Mrs. Tracey has served for a number of years as executive vice president and general manager.

DOROTHY M. J. TRACEY
. . . heads Tomkins-Johnson Co.

R. ADM. LOUIS DRELLER
. . . Brad Foote Gear eng.-director

R. Adm. Louis Dreller, USN (ret.), formerly assistant chief of the Office of Naval Material, was appointed director of engineering of **Brad Foote Gear Works Inc.**, Cicero, Ill., and its two subsidiaries, Pittsburgh Gear Co., Pittsburgh, and American Gear & Mfg. Co., Lemont, Ill.

Clarence J. Klein was elected vice president-engineering of **National Steel Corp.**, Pittsburgh. He has been vice president of engineering at Weirton Steel Co. since 1952.

Ernest E. Mankowski was made chief engineer of **Fresh'nd-Aire Division**, Cory Corp. He will have headquarters at the division's appliance plant at Grayslake, Ill. He formerly was air conditioning engineer for Coolerator Co.

Carl W. Kalchthaler was made chief engineer for **General Motors Corp.'s** Hyatt Bearings Division, Harrison, N. J., to succeed **H. Ralston Gibbons**, named technical assistant to the general manager. **Mark J. Garlick** was appointed assistant chief engineer at GM's Pontiac, Mich., Motor Division.

R. M. Abbott is resigning as executive vice president at Abbott Ball Co. to accept a similar position with **Seymour Mfg. Co.**, Seymour, Conn., on Sept. 1.

Connors Steel Warehouse Inc.,

NEAL L. COBB
. . . Fellows Gear Shaper chief engineer

HOWARD H. CASEY
. . . Midvale director-engineering

FRAZIER O. STRATTON
. . . Sterling Engineering chief engineer

Pittsburgh, appointed **William D. Rhodes** sales manager.

Neal L. Cobb, chief of tool design, was appointed chief engineer of **Fellows Gear Shaper Co.**, Springfield, Vt.

R. S. Orchard, production control manager, was promoted to automotive products manager of **Thompson Products Inc.'s** West Coast plant, Bell, Calif.

Continental Foundry & Machine Co., East Chicago, Ind., named **Paul A. Pierce** manager of operations. Formerly manager of foundries, he joined the firm in 1920.

Midvale Co., Philadelphia, appointed **Howard H. Casey** director of engineering to head its engineering, metallurgical and research staff.

Crucible Steel Co. of America appointed **Richard J. Rand** manager of the Cincinnati branch sales office to replace **H. E. Friedlein** who will act as special sales representative and consultant.

Lester M. Cole was appointed general sales manager of **Warner & Swasey Co.**, Cleveland. He established the Houston district office in 1936 and since 1946 has been southern district manager.

Frazier O. Stratton was named chief engineer of American Machine & Foundry Co.'s subsidiary, **Sterling Engineering Co.**, Laconia, N. H., acquired by AMF in 1951. Prior to joining Sterling in 1953 Mr. Stratton was associated with C. P. Clare Co., Chicago.

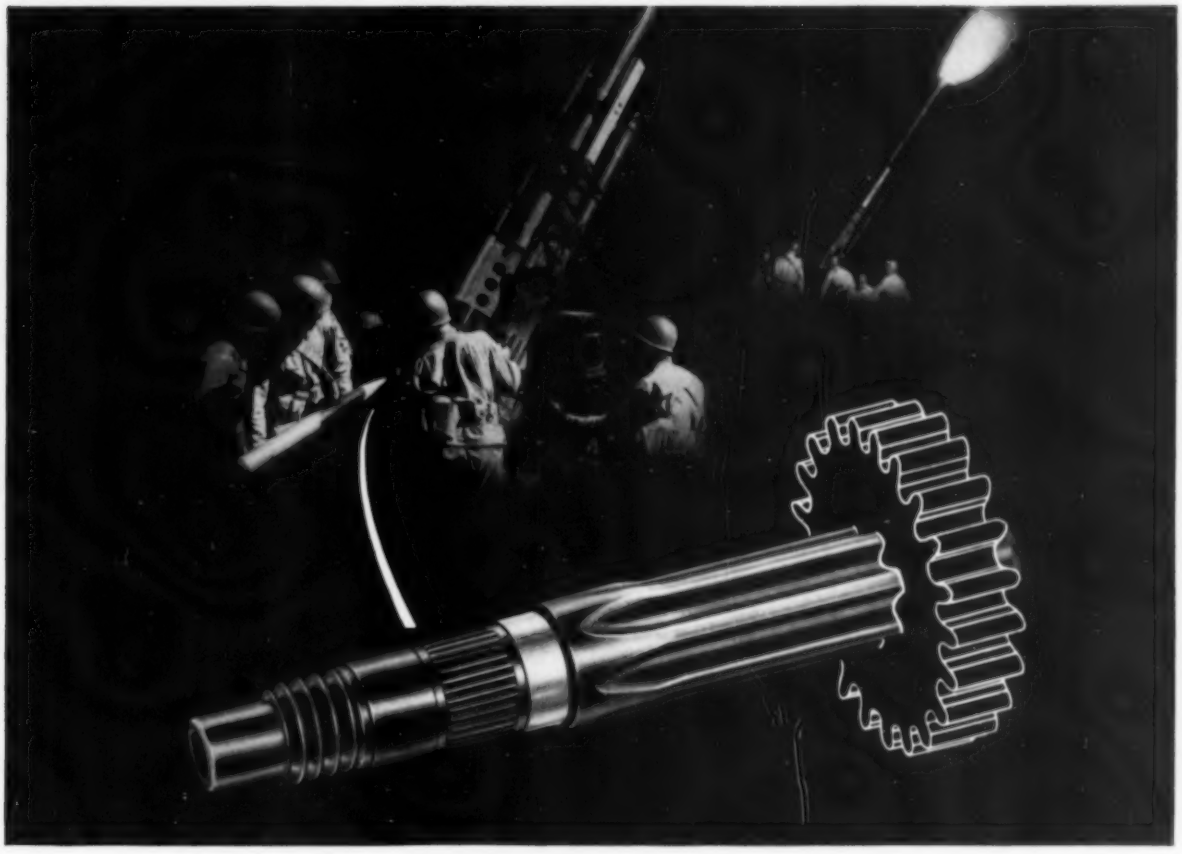
R. F. Edgar will head a new Chicago regional office of **Warner Electric Brake & Clutch Co.**

Louis M. Hardnack, as plant superintendent, is in complete charge of all phases of plant operations at **Paterson-Leitch Co.**, Cleveland. He has had many years of steel fabricating experience including

PAUL A. PIERCE
. . . Continental Foundry mgr.-operations

LESTER M. COLE
. . . Warner & Swasey gen. sales mgr.

LOUIS M. HARDNACK
. . . joins Paterson-Leitch



What has an ack-ack shell fuze to do with your present problem?

Plenty... as you'll see

You'll find this "flash channel" in time-and-point detonated shell fuzes that make our antiaircraft guns deadly to enemy planes.

The channel is Superior tubing—lead-pencil size. Along it races the flash-through—from point detonator to main powder charge—that explodes the shell on impact. The same tubing serves as a pinion in the gear train of a mechanical detonator, which explodes the shell at a set altitude. Result: double deadliness for ack-ack.

What about your problems? Wait just a moment . . .

Trouble was that flash-through must travel a perfectly straight path to prevent misfires. Ordnance had the dickens' own time with this problem. Flash channels of drilled bar stock proved untrustworthy. And it wasn't until Ordnance called on Superior that the puzzle was licked. A special grade of heavy wall Superior tubing—precision drawn Type C1118 carbon steel—proved perfect for the multiple close-tolerance machining needed to make the fuze part.

Now! You may need tubing made with the same accuracy essential in flash channels. And much of it may require special dimensions, shapes, even analyses. Superior makes a specialty of such special tubing. For example, you'll encounter Superior tubing in hypodermic needles, heat exchanger coils, truck wheel bushings, jet-engine ignition harness, and electronic parts of many kinds.

Superior will be happy to work with you in developing, designing and producing the tubing you need. If you have a problem involving tubing, get in touch with us. Write for a FREE copy of Superior's 40 page Carbon and Alloy Steel Catalog and more information on special tubing. Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

Round and shaped tubing available in Carbon, Alloy and Stainless Steels; Nickel and Nickel Alloys; Beryllium Copper; Titanium; Zirconium

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All analyses .010" to ⅝" O.D.
Certain analyses in light walls up to 2½" O.D.

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J. W. McMULLEN
. . . Lombard Corp. v. p.-engineering

EMIL J. McCAULEY
. . . supt. of Republic's hot strip mill

JOHN W. McALLISTER
. . . administrative asst. to CF&I president

service with American Bridge Co., Bethlehem Steel Co., Thew Shovel Co. and T.P.V. Co.

J. W. McMullen, chief engineer, was promoted to vice president in charge of engineering, a newly created position at **Lombard Corp.,** Youngstown.

Robert L. Boggs was appointed sales engineer, Butterfield Division, **Union Twist Drill Co.,** to serve in the Los Angeles office.

O. S. McGuffey, who has handled research and development work in many phases of transport refrigeration for **Tranter Mfg. Inc.,** Lansing, Mich., was named chief engineer of the firm. He succeeds the late **Carl I. Bloomquist.**

Jack J. Carlson was named assistant to the vice president at **Kaiser Steel Corp.,** Fontana, Calif., works.

William C. McDuffie was elected chairman of the board of **Northrop Aircraft Inc.,** Hawthorne, Calif.

Emil J. McCauley was named superintendent of the 98-inch hot strip mill at the Cleveland steel plant of **Republic Steel Corp.** He succeeds **J. J. Sullivan,** resigned. Mr. McCauley since 1946 has been superintendent of the hot mill at Warren, O.

B. Scott Rinehart was made West Coast sales manager for **Wapakoneta Machine Co.** with headquarters at Portland, Oreg.

Hallden Machine Co., Thomaston, Conn., appointed **John Upton Jr.** general manager to replace **Russell M. Barnes** who has left the company.

Harold W. Bartley was appointed director of material for **O. A. Sutton Corp.,** Wichita, Kans.

James R. Bradburn was elected president of **Electro Data Corp.,** Pasadena, Calif., electronic computer affilitate of Consolidated Engineering Corp.

John W. McAllister was made administrative assistant to the president of **Colorado Fuel & Iron Corp.,** New York. Associated with CF&I for over 30 years, he has been executive secretary to the president for several years. He maintains offices in Denver.

Frank N. Long was named superintendent of the newly created Zincgrip department at **Armco Steel Corp.'s** Ashland, Ky., Works. He formerly served as general foreman, galvanizing department.

Peter E. Kyle resigned as professor of metallurgical engineering at Cornell University to join the research and development firm of **Lessells & Associates Inc.,** Boston, as vice president.

Richard W. Bartlett was made director of purchasing and production planning for all plants of **Mather Spring Co.,** Toledo, O. He formerly was production control manager at A. O. Smith Corp.

OBITUARIES . . .

Arthur J. Knott, founder and treasurer, **A. J. Knott Tool & Mfg. Corp.,** Milford, Mass., died June 30.

Wilbur J. Hall, 92, retired traffic manager, **American Locomotive Co.,** New York, died July 7.

George L. McCarthy, 67, chairman, **Recordak Corp.,** New York, a subsidiary of Eastman Kodak Co., died July 9 at his home in Greenwich, Conn.

Sigurd H. Augensen, purchasing agent, **American Can Co.,** Milwaukee, died July 7.

Porter H. Norton, 74, former president, **Auto Wheel Coaster Co. Inc.,** Tonawanda, N. Y., died July 8.

Charles H. Sierks, 74, president, **Calumet Heat Treating Corp.,** Chicago, died July 8.

Harry L. Wood, 62, vice president, **Trundle Engineering Co.,** Cleveland, and a director of its subsidiary, Trundle Associates Inc., died July 14.

Sherman R. Lathrop, 57, service representative of **Onsrud Machine Works Inc.,** Chicago, died July 5 in England.

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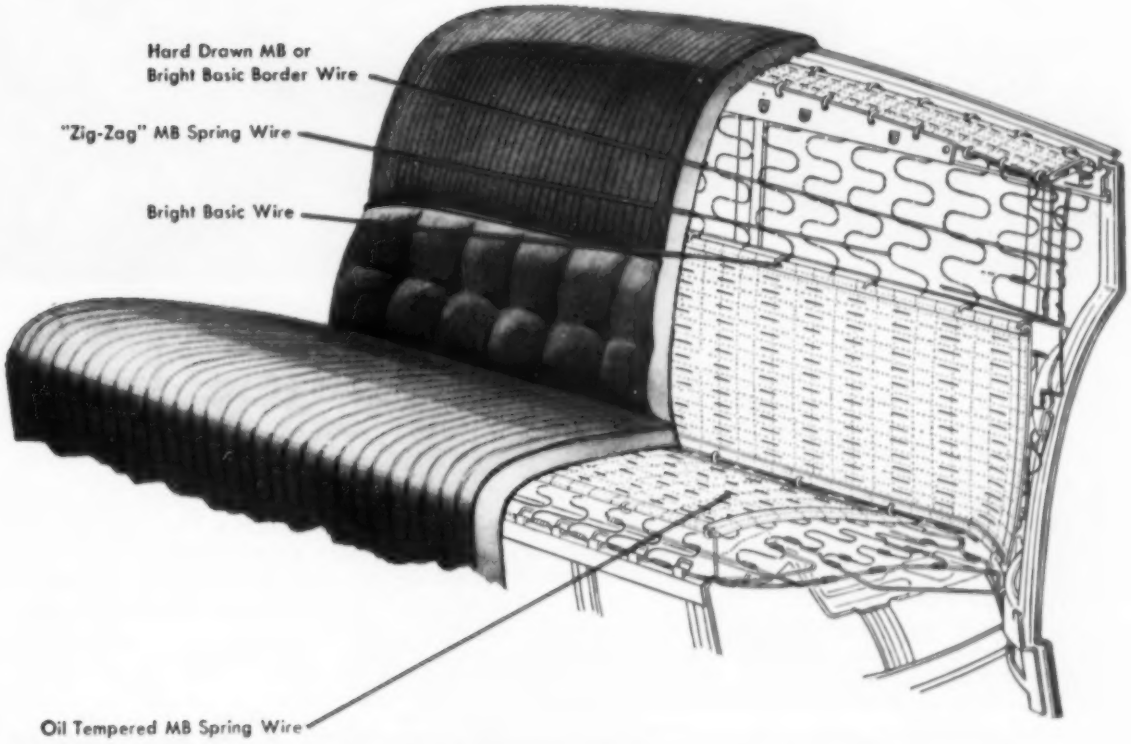
Wickwire Wire

New types of spring construction for seat and back cushions add immeasurably to the smooth, easy-riding comfort of today's automobiles.

Here again, as in so many other instances, the complete range of Wickwire Wire—high or low carbon, in all tempers, finishes and grades—provides exactly the right kind of wire for all parts of the complete spring assembly.

Good reason why Wickwire Wire is selected for the cushion spring units on many of America's leading makes of cars. Good reason, too, why it will pay you to remember—For The Wire You Require; Check First With Wickwire.



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Costs less to use!

As THE industry's *highest quality* maintenance material, Permanente 84 keeps steel furnace bottoms in good operating condition with *less material* than usually required.

Thus, it actually *costs less* to use Permanente 84 than materials with a lower initial cost.

Leading steel producers report that Permanente 84, by lasting longer, helps cut down-time for maintenance and repair as much as 50%!

This means Permanente 84 makes possible more steel at lower cost per ton.

Order Permanente 84 now, and get that extra tonnage! It's your *best buy* for bottom, bank and tap hole maintenance. Also ideal for open hearth and electric furnace rebuilds.

For complete information contact *Kaiser Chemicals Division,* Kaiser Aluminum & Chemical Sales, Inc. Regional sales offices: OAKLAND 12, California, 1924 Broadway; AKRON 8, Ohio, First National Tower; CHICAGO, 518 Calumet Bldg., 5231 Hohman Ave., Hammond, Indiana.

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Basic Refractory Bricks and Ramming Materials • Dolomite • Magnesia • Magnesite • Alumina • Periclase

Armco Expands Strip Mill

Hot-rolled pickled coils and Zincgrip sheets added to Ashland Works product line

ARMCO STEEL CORP.'s current $10-million expansion program at its Ashland Works, Ashland, Ky., is rapidly nearing completion, says W. W. Sebald, president. In addition to the $40-million hot strip mill completed last year, new facilities at this plant include a four-high 58-in. cold reversing mill, a continuous strip pickler and two Zincgrip lines. The latter units, one heavy-gage and one light-gage, coat strip steel with zinc in a continuous operation.

The cold reversing mill, the continuous pickler and the light-gage Zincgrip line are in operation. The heavy-gage Zincgrip unit, which will process steel as thick as 10 gage, is scheduled to begin operation within two months.

New Products—These new facilities will add several new products to those already produced at Ashland. Hot-rolled and pickled coils will be turned out at the plant, in addition to both light and heavy-gage Zincgrip sheets.

The cold reversing mill is powered by motors totaling 4500 hp and will turn out cold-reduced strip at a maximum speed of 1650 fpm. The mill will process strip up to 48 in. in width. The new Zincgrip lines have a greater capacity than any of the four similar units Armco already has in operation at its Middletown, O., and Butler, Pa., plants. The heavy-gage line will coat steel up to 60 in. in width; the light-gage line, up to 50 in.

A third phase of expansion at the Ashland Works is also well along, Mr. Sebald says. Additional coiling, shearing and slitting equipment will be installed this year, and added storage space for material-in-process and finished products is also under construction.

Cannon Electric Builds Plant

Cannon Electric (Canada) Ltd., affiliate of Cannon Electric Co., Los Angeles, is erecting a plant in Toronto, Ont., which will double its present facilities. The company makes electric connectors. The increased space will allow for expansion into other lines and for the installation of new types of machinery. The firm operates its own die casting equipment.

Ford Motor To Expand

Ford Motor Co., Dearborn, Mich., announced expansion plans, including a manufacturing development facilities building for research on manufacturing methods and processes. Located at the site of the Lincoln-Mercury Division's general parts depot at 12723 Telegraph Road, the building will contain laboratories and testing rooms and will permit consolidation of five manufacturing engineering development departments now housed in various buildings at the Rouge plant in Dearborn.

The company also will build three buildings and an addition to a fourth, totaling nearly 1 million sq ft of floor space at its Research & Engineering Center in Dearborn. The body engineering building will cover 551,201 sq ft of floor space; a scientific laboratory and research building, 385,636 sq ft of floor space for applied and basic research; a cafeteria building of 32,656 sq ft. The addition will be a new wing for the engineering staff administration building and will provide 24,000 sq ft of floor space for transmission department activities.

Wyckoff Opens Detroit Branch

Wyckoff Steel Co., Pittsburgh, opened a district office in the Fisher building, Detroit, and appointed Edward C. Koester as district manager. The company formerly was represented in the area by Craine-Schrage Steel Division of Detroit Steel Corp., Detroit.

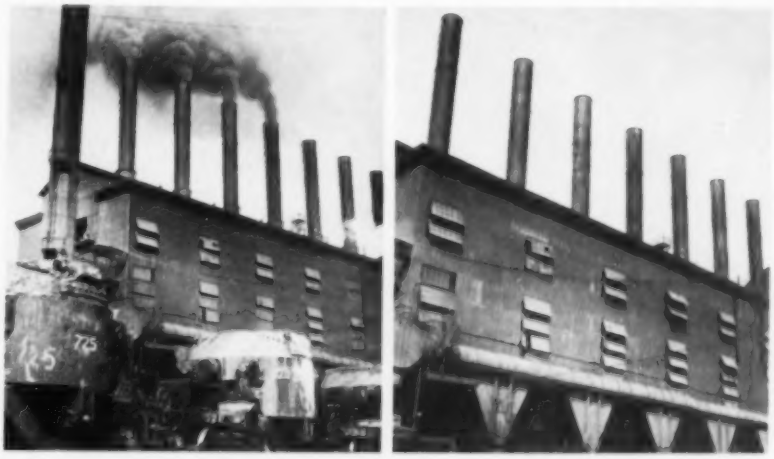
Martin Expanding Plant

Glenn L. Martin Co., Middle River, Md., is receiving bids on a $500,000 plant addition to be used for jet plane propulsion study, primarily with a view to suppressing the noise made by the jet type of plane.

Thorn Triples Plant Area

J. S. Thorn Co., Philadelphia, manufacturer of aluminum and steel windows, has started operations at its plant at 8501 Hegerman street, that city. The plant comprises 250,400 sq ft, thus providing more than three times the manufacturing space of Thorn's former facilities at 20th street and Allegheny avenue. New equipment

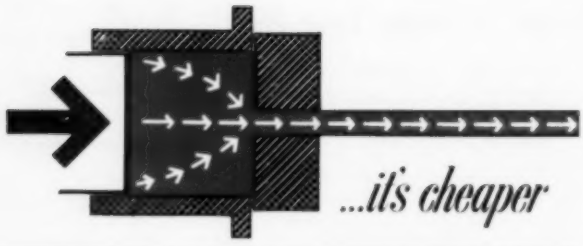
(*Please turn to page* 77)



Billowing Black Clouds Disappear from Pittsburgh Plant

As if by the sweep of a magician's wand, black smoke (above left) emanating from the Stirling boiler house stacks at the Edgar Thomson Works, Braddock, Pa., disappeared on the morning of July 14 (above right). The vanishing act was accomplished by the new blast furnace gas cleaning equipment placed into operation at this United States Steel Corp. plant. The installation completes the firm's program for cleaning all blast furnace gas in the Pittsburgh area

MOVE the metal



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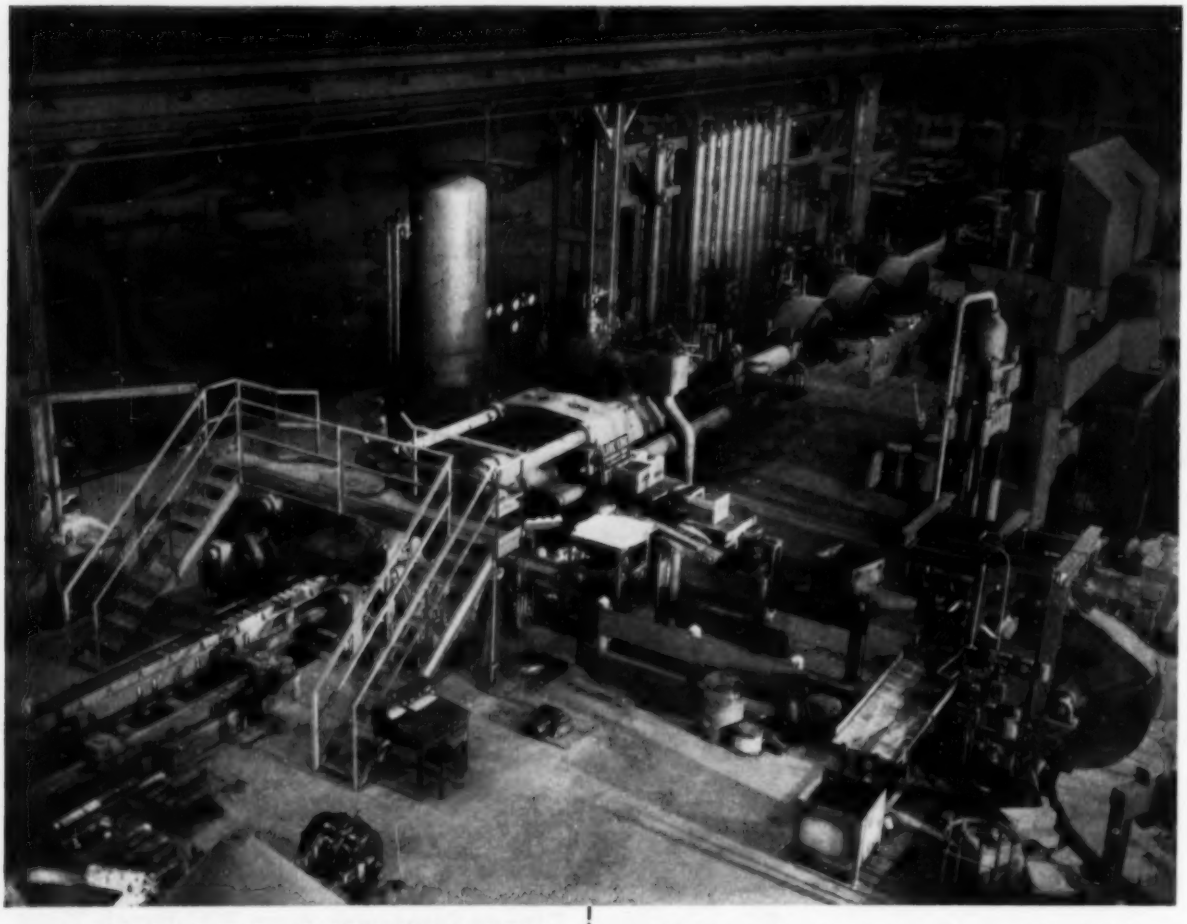
ALLEGHENY LUDLUM

shows how new method makes big saving in metal and machining



PACKAGED INSTALLATION

A new service by Lake Erie which enables you to order an integrated installation . . . including production equipment, tooling, auxiliary equipment and advisory service . . . from a single source, thereby saving time, money and trouble.

• Allegheny Ludlum's extrusion plant was installed by Lake Erie as a "packaged installation." Heart of the plant is the 1778 ton high speed double cylinder Lake Erie extrusion press. Other major units shown include the accumulator pumping system, salt baths, conveyor system and two Lake Erie piercing presses.

→→→→→→→→

than REMOVING it!

. . . Stainless steel is successfully hot extruded in a wide variety of shapes with cross-sectional areas ranging from 0.5 to 3.0 sq. ins. and in lengths of 12 to 60 ft.

. . . Titanium, zirconium, tool steel and high temperature alloys are being extruded experimentally with good results.

• The big trend in metalworking today is to force metal into a desired shape rather than to shape it by machining. This results in new and better products at lower cost. In addition to the type of extrusion done by the Allegheny Ludlum Steel Corporation, these new processes include cold "pressure" forging of aluminum, cold extrusion of steel, and high pressure closed die extruding of aluminum, brass and other non-ferrous alloys. Also falling within this category are somewhat older though greatly changed and improved methods for the extrusion of aluminum, hot forging of ferrous metals, powder metallurgy, deep drawing of sheet and die casting. These new and improved production techniques are already saving millions of dollars in materials and production time. Lake Erie engineers are in the forefront of these developments. They will be glad to explore applications in your production. No obligation. Call us.

LAKE ERIE
HYDRAULIC PRESSES

• Typical sections hot extruded by Allegheny Ludlum from series 300 and 400 grades of stainless steel. Included in current production are jet engine rings, turbine blades, special shapes for electronic equipment and similar products. Pieces generally have equal or improved physicals including density and grain structure when produced by "moving the metal rather than removing it."

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ROLLING MILL AUXILIARY EQUIPMENT

LAKE ERIE ®

Closed die extruding of heated aluminum is reducing production time 99% for one Lake Erie customer. ←

Cold steel extrusion is reducing scrap 43% and practically eliminating machining for another Lake Erie customer. →

Stainless, seamless tubing is another major product of the Allegheny Ludlum Extrusion Plant. →

BROWNHOIST

BUILDS BETTER HEAVY-DUTY MATERIALS HANDLING EQUIPMENT

ANNOUNCING AMERICA'S FIRST DIESEL ELECTRIC PILE DRIVER

The Industrial Brownhoist heavy-duty Diesel electric full revolving pile driver illustrated here is the first ever built. Maximum leader load is 26,000 lbs. Reach is 34' 1" from center of rotation and 20' 6" ahead of the front axle. Power battering leaders 50 feet long have a batter of 3 inches per foot. The leaders can be raised to driving position or lowered to traveling position in just one minute. Top travel speed is 20 m.p.h. with a maximum drawbar pull of 21,000 lbs. It can haul its own work train and is equipped with air brakes for braking the driver as well as the cars it is hauling.

Brownhoist also builds Diesel Electric Locomotive-Cranes in capacities from 25 tons up, Railroad Wrecking Cranes in capacities to 250 tons, boat unloaders, traveling bridge cranes, fast plants and other special equipment for handling bulk materials fast and efficiently in mines, railroads, docks and large manufacturing plants. For complete information about Brownhoist equipment to speed up your heavy materials handling, consult your nearest Brownhoist representative or write us today.

ANOTHER ADDITION TO THE FAMOUS BROWNHOIST FAMILY OF HEAVY-DUTY, TIME-SAVING EQUIPMENT

176

INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago, San Francisco, Montreal • AGENCIES: Detroit, Birmingham, Houston

(*Continued from page* 73)

includes a 200-ton extrusion press capable of turning out five to nine miles of aluminum shapes a day.

Sundberg-Ferar Opens Branch

Sundberg-Ferar, Royal Oak, Mich., industrial design firm, expanded its facilities by opening a branch office at 10 E. 49th St., New York. The office is in charge of Richard W. Figgins.

Foxboro Builds in Pittsburgh

Foxboro Co., Foxboro, Mass., manufacturer of instruments for the measurement and control of industrial process variables, is completing construction of a plant at 2270 Noblestown Road, Pittsburgh. A. H. Shafer is the district manager. The factory will double the firm's present instrument assembly, service and repair facilities. Another new plant was opened by the company in Dallas in April and a third, in San Leandro, Calif., will be ready by Aug. 15.

Toledo Desk Expanding

Toledo Desk & Fixture Corp., Maumee, O., maker of steel kitchen cabinets and bathroom vanities, is expanding. New buildings, land acquisition, improvements and new plant equipment will require an investment of nearly $2 million. Part of the project will be installation of new finishing and enameling system designed by DeVilbiss Co., Toledo, O.

Pittston Transfers Property

Pittston Co., New York, transferred to its wholly owned subsidiary, Sierra Ancha Mining Co., Grand Junction, Colo., all its uranium ore properties, claims and acreage in Arizona, Colorado, Utah and Wyoming. These properties comprise about 60,000 acres of potential uranium ore bearing lands and, in addition, the Red Buff mine in Arizona which is producing uranium ore at the rate of 1000 tons per month, with an estimated value of $30 per ton. The transfer was made primarily to increase the production of this uranium ore property as quickly as feasible.

Ralph H. Wilpolt was elected president of Sierra Ancha Mining Co.; L. J. Brewer was elected vice president.

K. R. Wilson Inc. Organized

K. R. Wilson Inc. was organized to purchase K. R. Wilson Co., Buffalo, manufacturer of automotive tools and equipment. Officers of the firm are E. E. Rassow, president; F. C. Wilson, chairman of the board and director of engineering; Manly Fleischmann, secretary. The firm's administrative and sales offices will be transferred to Arcade, N. Y.

Morse Chain Forms Division

Morse Chain Co., Detroit, organized an Application Engineering Division within the company's engineering department. The division was formed to meet application engineering requirements of the company's expanding lines of overload protection devices, cam clutches and couplings. It will be

The Production-WISE
ROLL FORMING MACHINE

ARDCOR MODEL 1-F

Spindle Diameter	1½"
Roll Diameter	4¼" to 7"
Horizontal Distance Between Spindles	12"
Roll Space on Standard Machine	10"
Capacity Max.	.072

ADAPTABILITY — Ardcor Standard Forming Machines feature "unit construction" for each stand. Thus production changes are easily and quickly made. With this feature, any length base can be furnished to accommodate additional units as required.

Ardcor Roll Forming machines embody the precision, accuracy and stability found only in the highest grade machine tools. In addition, Ardcor offers a completely engineered installation—cradle reels, roll forming machines, roller dies, flying cut-off fixtures, etc. —from one qualified source.

Likely as not your special shapes can be ideally handled by a standard Ardcor machine. Your inquiry is invited—without obligation.

Also Standard Machines up to 4½" Spindle Diameter.

American ROLLER DIE CORPORATION
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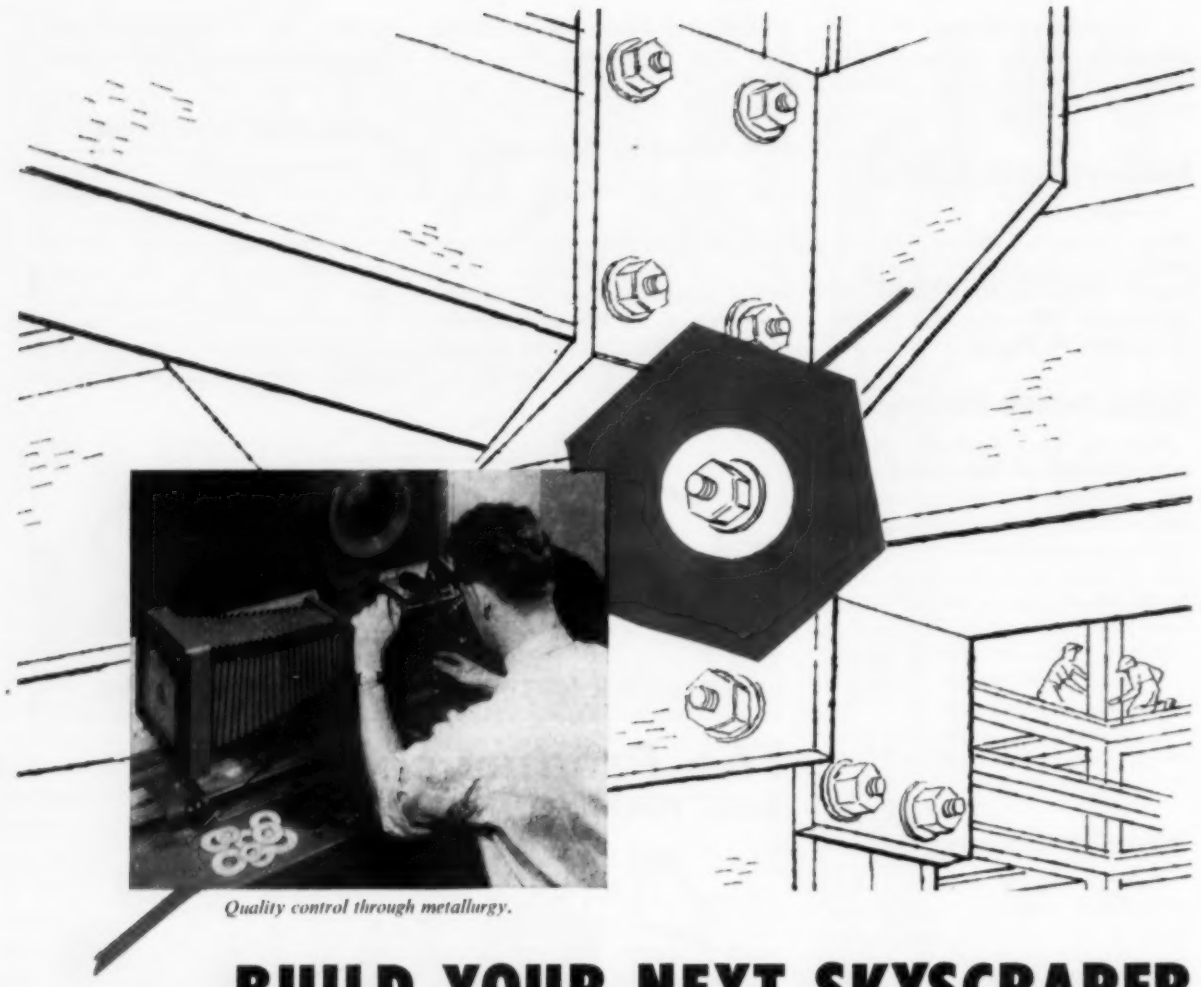

Quality control through metallurgy.

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This is the framework for a skyscraper. It's put together with high strength, *heat treated* bolts, nuts and washers—almost like a king-size Erector set.

There are other methods of erecting structures.. riveting or welding. But many of America's leading engineers favor the "high tensile strength bolt" method.

Why is bolting preferred? First, high-strength bolted joints are stronger.

Second, they are easier, less costly and safer to install.

Third, they require little if any maintenance.

Fourth, they eliminate the noise of riveting.

Where does Lindberg Steel Treating Company get into the act? Ours is simply a supporting role. We heat treat the steel washers..carloads of them for the U. S. Steel Supply division* of United States Steel Corporation.

Lindberg Steel Treating Company is equipped to handle your production heat treating, too. Giant heat treating furnaces..skilled heat treaters are at your command. What do you make..forgings, castings, wire products, fasteners, springs, wrenches, pins and bushings? Whatever it is, and whatever your volume..ten thousand or ten million..call Lindberg Steel Treating Company.

Heat treaters: *Have you written for your copy of the "condensed tempering chart"? It's a finger tip guide to the tempering of practically all types of steels. Available without charge.*

**Through Wrought Washer Manufacturing Co., Milwaukee, Wisconsin*

A case history of Lindberg Steel Treating Co. service to American industry

LINDBERG STEEL TREATING CO.

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Giant's Mask?
This huge mask-like steel object is actually the first of six 29,800-lb ladles made at U. S. Steel Corp.'s Johnstown, Pa., Works. It will be used in a South American copper mill

headed by R. E. Cherry, former executive engineer of the Morse Detroit plant.

Vlier Engineering Expands

Vlier Engineering Inc., manufacturer of tooling specialties for jigs and fixtures, is expanding production facilities at 8900 Santa Monica Blvd., Los Angeles.

Firm Enters Sintering Field

Heyl & Patterson Inc., Pittsburgh, was granted exclusive marketing rights to the sintering machine developed and patented by Charles E. Agnew, consulting engineer, Cleveland. The agreement enables Heyl & Patterson to offer to industry facilities for the design, fabrication and erection of complete sintering plants.

Little Expands on West Coast

Arthur D. Little Inc., Cambridge, Mass., acquired the research and development division and laboratories of Merrill Co., a metallurgy and engineering firm in San Francisco. The laboratories are now known as Western Laboratories Division, Arthur D. Little Inc.

Esso To Build Plant in East

Esso Standard Oil Co., with division offices at St. Paul place and Franklin street, Baltimore, has awarded to Whiting Turner Con-

Model 16-3 Contour-Matic DoALL Band Machine mounted on UNISORB pads to reduce transmitted vibration. No bolts or screws are used. Machine is supplied with 4 UNISORB pads and cement which dries overnight.

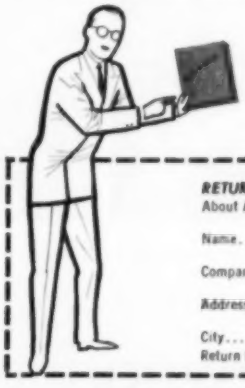
UNISORB® MOUNTING PADS are supplied with the new DoALL Contour-Matic Band Machines...

New Contour-Matics are installed on UNISORB pads, without floor drilling, without bolting the machines in place.

Practically every type of production machine can be quickly installed on UNISORB pads. Labor savings are as much as 20%. Transmitted vibration is reduced 60% to 85% and you get quieter operation.

For full information about this modern way to install your machines, return the coupon for your free copy of the booklet about UNISORB.

LOOK FOR THE RED CENTER AND UNISORB BRAND MARK



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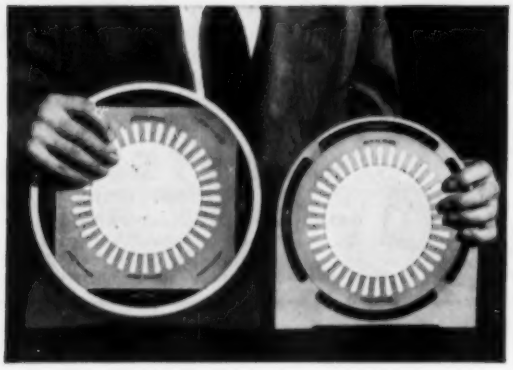
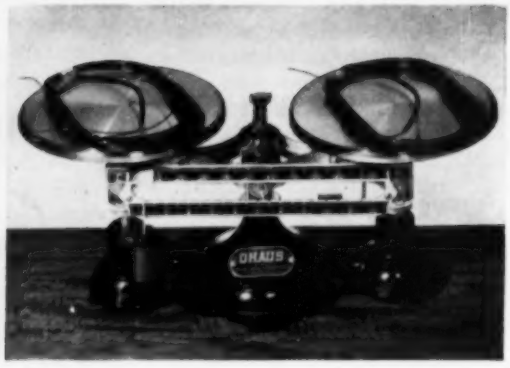
Here are laminations from two 5-hp Life-Line motors. Note that only the inactive support corners of the original Life-Line square stator have been eliminated from the round stator of the Life-Line "A" motor.



When the stators are placed in their respective frames we see how the Life-Line "A" size reduction has been accomplished without sacrificing active magnetic steel. Excess air space has been eliminated also.



Copper, the other important active material, has not been sacrificed. The coil on the left is from an original Life-Line motor. The coil on the right is from a new Life-Line "A" motor. Both weigh the same.

Here's how more horsepower has been put in the Life-Line A motor

These demonstrations show how motor performance is determined by "active" material

Perhaps you are a motor user who has raised the question: "How can you shrink the size of a motor and still equal or better the original performance?" Let's look inside a motor to find the answer.

The performance of any motor is dependent upon its active material—the magnetic steel and copper. Take the original Life-Line® and the new Life-Line "A" for example. The amount of magnetic steel in the stator and rotor and the copper in the coils of both Life-Line designs are the same. The reduction in size has been accomplished by eliminating inactive material and space. Thus you have a smaller motor whose basic electrical performance remains unchanged. In fact, the Life-Line design principle has been proved in service for over seven years. J-21848

For the complete story on the new Life-Line "A" motor write for your copy of Booklet B-6154. Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

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Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn. In Canada: Dominion Chain Company Ltd., Niagara Falls, Ont.

plus Links Shackles Hooks

tracting Co., that city, a $2-million contract for certain sections of a new bulk plant in Gusryan street, adjacent to the company's Canton refinery. In addition, plans call for over 20 large storage tanks.

Tubing Fabricator Expands

Tube Benders & Fabricators Ltd., Toronto, Ont., completed construction of a plant in Streetsville, Ont. The firm is engaged in the precision bending and fabricating of tubes and pipe for Canada's growing aircraft industry. J. A. H. Brocklebank is managing director.

Stratoflex Builds Plant

Stratoflex Inc., Ft. Worth, Tex., is constructing a manufacturing plant at 9430 Bellanca Ave., Los Angeles, for manufacture of aircraft and industrial hose, hose fittings and hose assemblies.

Marine Electronics Expands

Marine Electronics Inc., Baltimore, manufacturer of electrical specialties, is placing a new 17,000-sq-ft plant into operation at 1805 Cherry Hill Road, near Waterview avenue, that city. J. A. Richardi is president.

Conveyor Firm Opens Office

Standard Conveyor Co., North St. Paul, Minn., officially dedicated its new office building recently. The firm's products include power and gravity conveyor units.

Denison Establishes Division

Denison Engineering Co., Columbus, O., established an Aircraft Products Division to manufacture items for sale to the aircraft industry. Principal products are variable volume aircraft pump, surge pumping valve, aircraft fluid motor and relief valve. E. L. Shaw is in charge of the division; R. N. Crossley, director of sales; and James Parr, chief engineer.

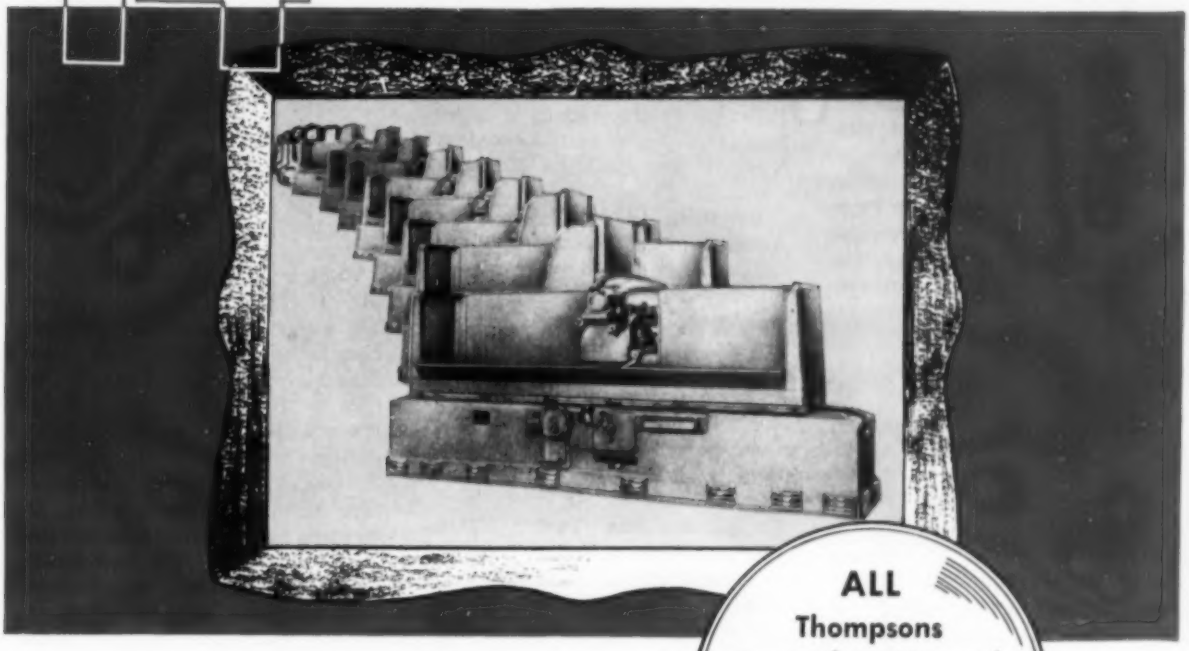
Solar Warehouse Adds Products

Solar Steel Corp., Cleveland, established a department at its

LOOK CLOSELY AT THIS PICTURE
OF GRINDER PRODUCTION AND SEE WHY...

14 *is a lucky number*

for a manufacturer requiring precision grinding



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Thompson Grinders

After twelve years continuous manufacture of precision ground products, ten Thompson Surface Grinders proved so efficient and economical that this manufacturer ordered four more machines.

Thompson Grinders are available in a wide range of types and sizes from 6" x 18" to 72" x 384" to meet all production, special or tool room grinding requirements. The Thompson line includes machines from giant Hydrial Way Grinders to automatic Truform Jet Blade Contour Grinders, Dual Rotary Grinders and Broach Grinders.

CONTACT THOMPSON TODAY FOR HELP WITH YOUR MACHINING PROBLEMS

THE THOMPSON GRINDER COMPANY
Springfield, Ohio

Union, N. J., warehouse to supply hot-rolled plates, structural shapes, bars and bar shapes. Solar at Union has been a leading supplier of sheets and strip for many years. The firm appointed J. Harry Horstmann, a former vice president of Albot Steel Co., Lyndhurst, N. J., as manager of the new department.

NEW ADDRESSES

Luria Engineering Co., designer and fabricator of standardized industrial steel buildings and airplane hangars, moved its main offices to 511 Fifth Ave., New York. The export department and New York district sales offices are included in the move, as are offices of the affiliated **Luria Steel & Trading Corp.**, which trades in iron and steel scrap, and **Luria Supply Co. Inc.**, steel warehousing concern. Luria Engineering Co.'s fabricating plant is in Bethlehem, Pa.

ASSOCIATIONS

Harold C. Stuart was elected president of **Aircraft Service Association Inc.**, 1001 Connecticut Ave., N.W., Washington 6. The association represents leading aircraft and engine overhaul-modification and service companies.

Max F. Balcom was elected chairman of the board, **Radio-Electronics-Television Manufacturers Association**, Washington. Glen McDaniel was re-elected president and general counsel; L. F. Muter, treasurer; and J. D. Secrest, executive vice president and secretary.

REPRESENTATIVES

Emhart Mfg. Co.'s Henry & Wright Division appointed Bryant Machinery & Engineering Co., Chicago and Milwaukee, as its midwest sales representative. The firm's products include drilling and dieing machines and steel presses.

De Laval Steam Turbine Co., Trenton, N. J., appointed Haytian Tractor & Equipment Co., Port-au-Prince, Haiti, as its representative in that country. The firm's products include steam turbines, centrifugal pumps, speed reducers, couplings, compressors and blowers.

Greer Steel Co., Dover, O., appointed Frank W. Ladky Associates Inc., Milwaukee, as its sales representative for the state of Wisconsin.

American Smelting & Refining Co., New York, appointed Oglebay, Norton & Co., Cleveland, as exclusive sales agent for the sale of its Minac brand fluorspar to the glass and ceramic industries. The fluorspar is the product of American Smelting's mill located at Nueva Rosita, Coahuila, Mexico.

Beryllium Corp., Reading, Pa., named J. M. Tull Metal & Supply Co. Inc., Atlanta, as its warehouse distributor for its beryllium copper wrought products in the southeastern states.

Reynolds Metals Co., Louisville, has appointed U. S. Steel Supply Division of United States Steel Corp., Pittsburgh, as distributor of its aluminum mill products in St. Louis; Memphis, Tenn.; Kansas City and Wichita, Kans.; Tulsa and Oklahoma City, Okla.; Little Rock, Ark. The products will be distributed from a warehouse located at 311 S. Sarah St., St. Louis. U. S. Steel has been distributing the Reynolds products for some time through its warehouses at Chicago, Milwaukee, St. Paul and Los Angeles.

Conoflow Corp., Philadelphia, appointed Watts Co., Houston, as its sales representative in southeastern Texas and southwest Louisiana. Conoflow makes pneumatic final control elements.

Allis-Chalmers Mfg. Co., Milwaukee, appointed Westville Electric Co., New Haven, Conn., as distributor for its motors and controls.

Clark Equipment Co., Buchanan, Mich., appointed Highway Machinery & Supply Co. Inc., Richmond, Va., as its agent to sell and service the line of fork-lift trucks, straddle carriers and other materials handling equipment manufactured by Clark's Industrial Truck Division.

Warner Electric Brake & Clutch Co., Beloit, Wis., named Hadco Engineering Co., Huntington Park, Calif., as West Coast distributor of running gear, including wheels, axles and electric brake installations for every type of coach trailer.

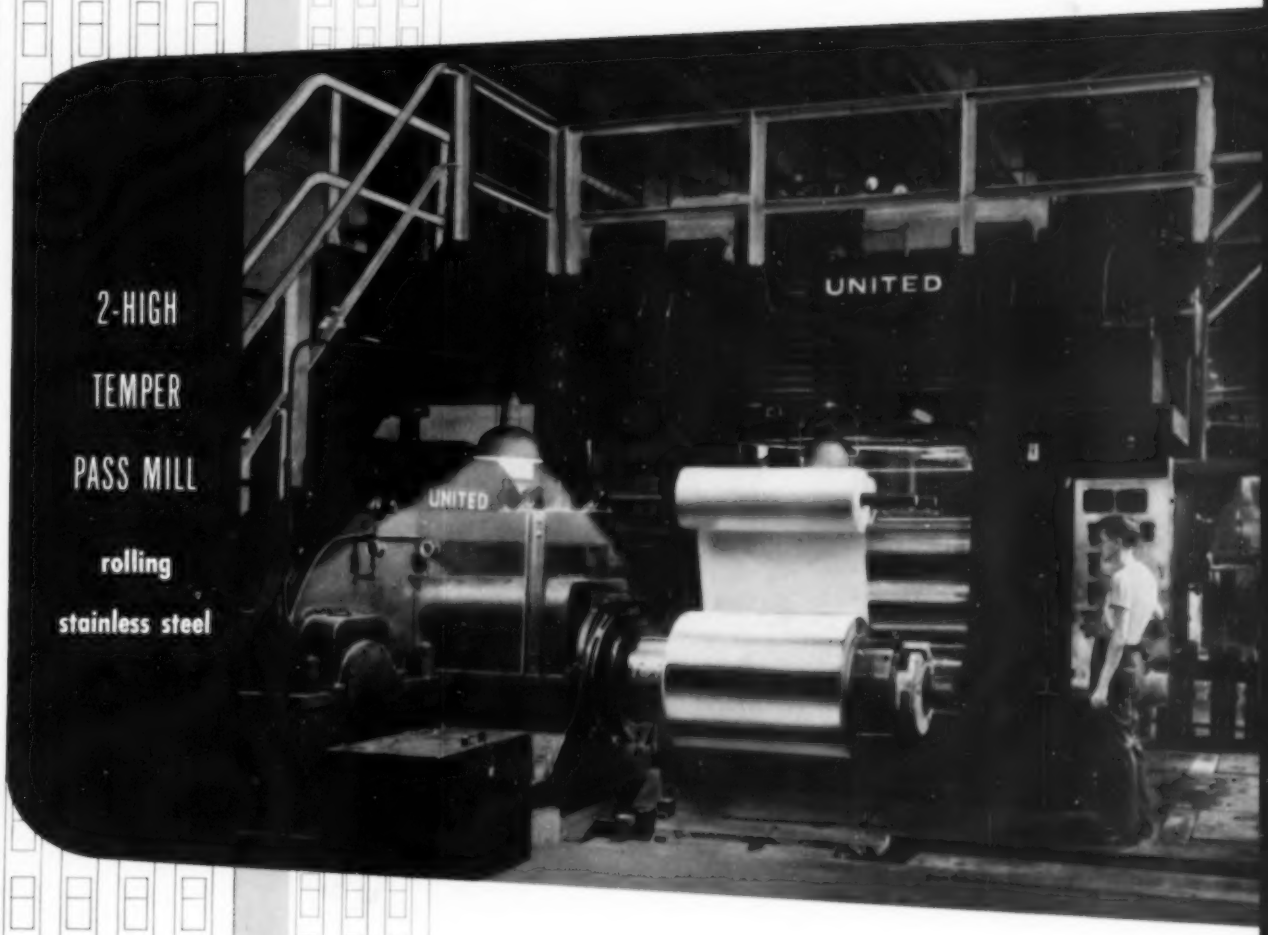
Mercury Mfg. Co., Chicago, manufacturer of industrial trucks, tractors and trailers, appointed Associated Agents Inc., Greensboro, N. C., as its representative in the Carolinas.

Chrysler Corp.'s Airtemp Division, Dayton, O., appointed Eastern Co., Providence, R.I., and Cambridge, Mass., as a distributor of its line of packaged residential and commercial air conditioners.

Sales and distribution of Ingersoll KoolShade products, which are manufactured by **Borg Warner Corp.'s Ingersoll Products Division**, Chicago, will be handled in the future by Reflectal Corp., a Borg-Warner subsidiary whose executive offices are being transferred from New York to Chicago. The operation will be directed by R. G. Nordstrom, general manager of Reflectal. Under the reorganization, Reflectal will manufacture and distribute aluminum foil reflective insulation and will serve as the sales organization for the distribution of KoolShade sun screen and porcelain enamel, galvanized and aluminum roof deck material manufactured by the Ingersoll Products Division.

ANNIVERSARIES

Crane Co., Chicago, observed on July 4 the 100th anniversary of its founding. The company originally supplied brass lightning rod tips; today, its 40,000 products fall into four categories: Valves, fittings and fabricated piping; plumbing equipment; heating equipment; and aircraft accessory equipment. Crane also has under construction a plant to manufacture titanium at Chattanooga, Tenn.



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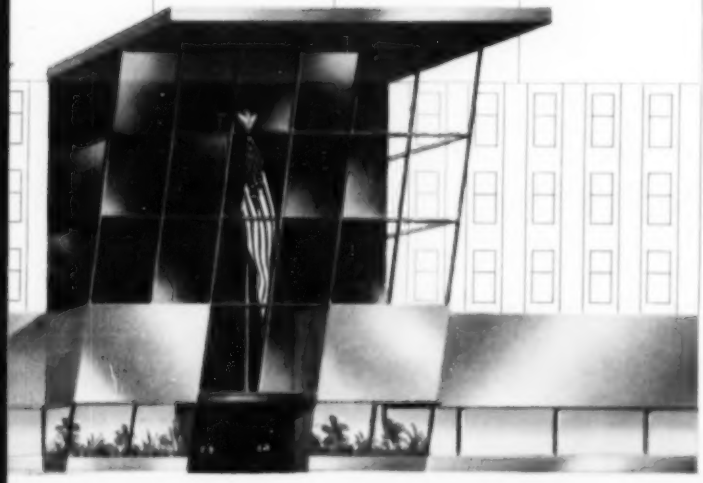

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DISTRIBUTORS IN THE PRINCIPAL CITIES OF THE WORLD

Technical Outlook

SUBSTITUTE— If you, like many platers, are having nickel troubles, here are some test results on bronze, reported by Battelle at the American Electroplaters' Society's annual meeting in New York, week before last. A bronze plate (about 20 per cent tin and balance copper) followed by chromium is nearly the equal of nickel-chromium plate. Bronze, plus thin nickel plate, actually showed up better than thick nickel in a marine atmosphere. Bronze, plus chromium, got a higher corrosion rating than copper plus chromium.

NEGATIVE FATIGUE— Another note from the platers' meeting: Two aircraft companies are plating heavy nickel under compression from a special sulphamate type bath to protect surfaces from nicks, scratches or dents that might lead to fatigue failure. Leading edges of propellers and jet engine compressor blades are protected from small stone abrasions by the nickel plate under 2500 to 8000-psi compressive stress.

MORE TOP PRESSURE— Apparently satisfied that the process really has merit, U. S. Steel recently signed a licensing agreement with Arthur D. Little Inc. which will permit them to convert an undisclosed number of blast furnaces to high top pressure operation. By throttling gases from the furnace, pressure is built up and reducing gas flow is slowed down. This boosts output, cuts coke consumption and reduces flue dust losses. Daily output has been up 15 per cent in some plants. Cost of installation represents about two per cent of original furnace cost.

BIG CHAIN FOR BIG JOB— Navy's new attack carriers of the Forrestal class will be equipped with the largest anchor chain ever used. It will have a breaking strength in excess of 2½ million pounds. A single dielock link of the chain weighs 360 pounds and is 2 feet 4½ inches long, 17¼ inches wide and 4¾ inches in diameter at the smallest cross section. The Boston Naval Shipyard was chosen as the site of the 25,000-pound drop hammer and other principal facilities required for its production.

NEW COMBINATIONS— A thick layer of copper permanently bonded between two sheets of stainless steel is material used by Bridgeport Brass Co. for a new line of kitchen utensils. Combination gives easily cleaned sanitary features of stainless plus high conductivity and even heat features of copper. Another utensil line will use stainless completely covered with a thick layer of copper, both sides and bottom.

PROBLEM SOLVED— Strips of neoprene sponge are being used by British coal mine operators to eliminate one source of dust—and a potential fire hazard in the mines. Strips are threaded through each side of the wire fastener, which is used to splice sections of coal conveyor belting. They seal the splice and prevent dust from jiggling through the fastener as it bounces over idler rollers.

LESS MAN HOURS— Air Force research people have developed a method to automatically record time-deformation readings in creep rupture testing. Technique uses movie cameras to record time, temperature and strain dials of each creep rupture testing machine. Idea has cut the man hours per test by 75 per cent.

CERAMICS GROW— Use of ceramic materials is on the up-grade in high temperature applications where economics are important. George J. Easter, Electro Refractories & Abrasives Corp., Buffalo, gives these examples of accomplishments already chalked up: Use of silicon carbide blocks as skid rails in steel mills; substitution of ferrites for electromagnetic metals in electronics; ceramic coating of metals for jet engine and rocket propulsion; replacement of metal cores in electromagnets.

Metalworking Outlook—p. 37 *Market Outlook—p. 125*

Muskegon Piston Ring Co. uses adhesive to "unitize" the oil ring assembly for easy insertion on the piston. Adhesive is specially formulated to dissolve in the hot engine oil and be drained off at the first oil change

Autoworker rolls a roof pad into place as car moves down assembly line. Adhesive here is so designed that it absorbs the stamping lubricant left on the metal, then makes a bond that withstands 200° to —20°F range

Adhesives Join The

They've come a long way since the fish-glue days. Chances are there's an adhesive solution to some of your tough joining problems. Don't be influenced by old misconceptions

REMEMBER when the automotive industry went to all-steel bodies, how they still had to build-in wooden nailing strips for the upholstering? Try to find any of those strips in the modern car. You won't because they do their upholstering with adhesives now.

That's only one example of the steady and quiet progress of modern adhesives. Steady in its 12 to 15 per cent per year growth pattern; quiet because few people outside of the adhesives industry itself can actually appreciate the growth.

Invisible Bond—Trouble with modern adhesives and sealers is that they are almost always utilized inside, behind or between the components of the finished product, and chances are, the more inconspicuous the adhesive is, the better job it is doing. This characteristic of the adhesive is one of the reasons why application lags behind product research and development.

How can you tell whether adhesives fit into your production plans if it isn't apparent where others are using them?

That's only one of the handicaps. Mention adhesive to the average man and he immediately thinks of glue—the kind he uses to mend furniture, china, etc. And, as fate would have it, he remembers the troubles he has encountered trying to make a sound bond. However, any comparison of materials and methods of present-day adhesives bonding to the glue concept would be completely meaningless.

The Brighter Side—Discounting these misconceptions and their effect on the growth rate of indus-

COMMON MISCONCEPTIONS

1. *The more adhesive you use, the better the bond.*
   Reason: Common thinking seems to be "If a little adhesive does a good job, a lot will do a better job."
   The Facts: The thicker the adhesive film, the more chance there is of having a weak bond. A simple demonstration: If a piece of string 10 feet long is pulled at both ends it will eventually part at the weakest point. However, if the string is cut into 10 one-foot pieces and each piece is pulled individually only one of the pieces will break under the same loading as the long piece. The other nine sections will show higher strength.
2. *Adhesives are only useful on low strength operations.*
   Reason: Most bonding operations involve materials which are to be held in place, with little stress applied. Since most adhesives are used for jobs such as these it is assumed that all adhesives have relatively low strength.
   The Facts: Adhesives are presently used for such high strength operations as bonding brake linings; joining metal sheets for aircraft skins; vulcanizing heavy rubber sheet to steel rolls; mounting heavy machinery on rubber shock pads, and other similar jobs. Adhesives are available which will provide strength in excess of 3000 psi.
3. *All adhesives are "glue."*
   Reason: The term "glue" originally referred to the age-old adhesive derived from fish or animal matter, but has, over the years, become somewhat of a generic term which many people use to describe any adhesive. This has led many people to associate the properties of "glue" with modern synthetic adhesives.
   The Facts: Synthetic elastomer-based adhesives differ so greatly from fish and animal "glues" that the products are only similar in the respect that they are both used to hold materials together. Glue, as such, is a relatively difficult material to use and possesses little o- no flexibility, temperature resistance, or other properties made available in synthetic products. Today, most industrial operations which utilize an adhesive are done with synthetic rubber or resin-based adhesives which allow variations in the method of

At Jefferson Electric a metal gear ring is bonded to glass faces of modernistic clocks. Adhesive is applied by pressure tube; bond is air cured at room temperature

Rawhide clutch faces are bonded to die-cast clutch unit at Hotpoint. Pressure at 60 psi and 375°F heat complete the bond in 1½ minutes in this custom-built fixture

Assembly Line

By THOMAS F. HRUBY
Associate Editor

trial adhesives, the number of metalworking applications continues to grow. With what other method can you join so many dissimilar materials?

The field of modern insulation, for instance, probably would not be so far advanced were it not for adhesive techniques for joining insulating material to metal panels of autos, appliances, furnaces, air conditioners, etc.

Another notable example is adhesive-bonded brake linings. Why, pondered the automotive engineers, must effective braking area be reduced by the rivet holes? It didn't have to be, and the result is a better-performing, longer-lived assembly.

Thinner Metals—Since there is no piercing for rivets or possible structure damage from welding temperatures, designers are finding they can utilize thinner-sectioned material. Good example of this point is honeycomb structural material. This fast-growing material (lightweight core, sandwiched between two relatively tough, thin skins of metal, plastic or wood) would be impossible to conceive without the adhesive bond between cellular walls and skin.

Structural advantages of adhesive bonding are apparent if the bond is imagined to contain millions of molecular-sized fasteners, each capable of withstanding a tiny portion of the force. Load is thus uniformly distributed over the entire joint area, and stress concentration is greatly minimized.

To date, the aircraft industry has accumulated the greatest amount of metal-to-metal bonding experience. Improved fatigue characteristics over riveted structures have been reported in many applications. The English, for example, tested adhesive-bonded stiffener panels with 4½ million stress cycles before failure occurred; same panel of riveted design withstood only 300,000.

Tops As Sealer—Increasingly im-

AND THE FACTS

application, drying rates, strengths, and resistance to particular conditions. Adhesives today are compounded to do special jobs, and one adhesive is not expected to do all jobs.

4. ***All adhesives require clamping or shoring until dry.***
Reason: "Glue" (fish or animal types) develops little stickiness or tack and will not hold materials in place as soon as the bond is made unless supported by a clamp or shore.
The Facts: Here again a difference between old style "glue" and modern synthetic based adhesives shows up. Present adhesives develop a high degree of tack, and when the bond is made have considerable immediate strength. Even heavy materials can be bonded with modern adhesives without slipping or falling and require no clamping or shoring.
5. ***Hand application is the only way adhesives can be used, and this method is too slow for production operations.***
Reason: Many adhesive applications are made by hand for small or isolated bonds. Observers or users of such methods are not familiar with the potentialities of adhesives and assume that they can only be applied by hand.
The Facts: Adhesives can be applied by brush, spray gun (either hand operated or automatic), roller-coater, knife-coater, flowed, or dipped. Mechanical operations are particularly adapted to continuous applications and adhesives are available to meet all methods of application.
6. ***Adhesives do not stick well to metal or other nonporous surfaces.***
Reason: Bonds made with an adhesive and containing metal as one or both of the bonding surfaces have been separated and the adhesive either remained soft and weak, or peeled clean from the metal surface.
The Facts: Two things can cause failure to adhere to metal; (1) The metal surface was not clean when the bond was made; and (2) the adhesive was not thoroughly dry when the bond was separated.
If there is a film of rust, dust, grease or oil on the

portant in metalworking applications is the notable advantage adhesive bonding offers in the matter of sealing. This sealing function isn't limited to gasses and moisture but includes sealing against electrical conductance, thermal changes and galvanic corrosion. This last plus is often of sufficient importance to demand use of adhesives in preference to a mechanical bond when joining dissimilar metals.

This sealing action, by the way, is not to be confused with that same function performed by actual sealing compounds, the first cousins of the adhesives. In the former, both bonding and sealing functions are performed by one substance, while sealers themselves are ordinarily used to close-up the seams following other bonding methods.

Word of Caution—Despite their enthusiasm for their products' future, adhesive producers will be the first to tell you to hang onto your welding and riveting equipment. Adhesives are not expected to eliminate all other joining methods, but they will move into an increasingly large area that until now seemed out of the realm of adhesive applications.

A comment typical of the adhesive industry thinking is that of Dr. C. W. Walton, who heads up Minnesota Mining and Mfg. Co., Adhesives and Coatings Division: "The number of inquiries received from the field for structural or load-carrying adhesive applications is steadily increasing. This indicates that designers and engineers are depending today upon such adhesives in a variety of new applications. Due to the technological advancements that have resulted in improved raw materials being made available, and increased technical knowledge and skill in formulating them, we are confident that new products can be provided to meet the future performance specifications of structural or load-carrying adhesives."

Door-Opener—With the old-style natural and reclaimed rubber adhesives the load-carrying applications would have been impossible. Development of the GR-S rubber (butadiene-styrene) family of adhesives opened the door to more permanent, load-carrying applications. Since then the buna N, neoprene and butyl bases have come on the scene to make the thermoplastic rubber adhesives still the most versatile group.

Most of the special-purpose adhesives are found in the resin-based groups, either natural or synthetic. Cellulose derivatives, vinyls, acrylics and the other thermoplastic resins can either be dissolved in solvent or emulsified in water. Unlike the thermo-setting resins (ureaformaldehyde, melamine, resorcinol, expoxy) the thermoplastics soften with heat and do not change chemically during bonding. Pressure, heat, or both, are usually required when bonding with resin-based mixes.

To achieve good immediate bond strength, together with the advantages of high-cured strength, rubber-resin blends have been devised. They serve well in metal-to-metal bonds, where a fairly rigid cured film is desirable, one having a slight amount of elasticity that permits stress distribution in the joint. This group has the highest shear strengths—3000 to 5000 psi.

Design Changes—Putting adhesives to work for you is more involved than merely substituting one joining method for another. Greatest strength in an adhesive joint lies along the shear plane, so the joint design should take advantage of this fact. Peel stresses are the most damaging so the design should minimize them. Adhesive manufacturers have built up a wealth of application information that is readily available to anyone interested.

This then, is the educational phase for industrial adhesives. Manufacturers have concocted hundreds of practical adhesive formulas and defined the application limits for each. More and more users are learning the ABC's of adhesive bonding by working with the manufacturers. Once confidence is gained in the bonding materials, look for mushrooming of applications that will utilize fully the potential of adhesives.

metal when the adhesive is applied, the adhesive will stick to the surface of the film but will not get to the surface of the metal. The result is that when the bond separates it is caused by the film of foreign material.

If the adhesive is not dry and the bond is separated, the adhesive film will many times pull away from the metal. This is caused by the small amount of solvent in the adhesive collecting and condensing on the naturally cooler metal surface. This minute solvent layer acts as a lubricant and allows the adhesive to strip cleanly from the metal surface. When the adhesive is thoroughly dry it will adhere firmly to the metal, often with greater strength than the strength of the material bonded to the metal.

7. ***Mechanical fastening methods are stronger and less expensive.***

Reason: When a seam is stressed where mechanical fasteners such as bolts, screws or rivets or stitching have been used, the material generally tears out before the fastener breaks. Whereas with adhesives the adhesives may give way before the material fails.

The Facts: Per unit area of joint, mechanical fasteners do have a higher tensile strength than adhesives, but do not impart this strength to the materials being joined as do adhesives. In order to use fasteners such as bolts, screws and rivets, it is necessary to pierce the materials being joined thus weakening the structure of these materials.

The holding action of mechanical fasteners is generally concentrated in a small area around the fastener and when stress is applied the stress too is concentrated at these points. This results in a tearing of the joined materials at their weakest point, or the point at which they have been pierced.

When an adhesive is used for joining the materials, the stress is spread evenly over the entire area of the joint, which results in greater over-all strength of the joint, since the metal or other material is not weakened or otherwise damaged. When figuring over-all cost, including speed of application and operations involved, adhesives, where adaptable, often allow savings of 50 per cent or more in over-all production costs.

CHECK CHART OF ADHESIVE APPLICATIONS

Job Conditions	Type of Adhesive	Reason	Typical Applications	Application Methods of
1. High speed or continuous production.	Fast drying solvent type or fast "breaking" water dispersion.	To reach greatest degree of tack and immediate bond strength in shortest time.	Laminating foil and plastic barrier materials.	Roll-coater knife coat or spray
2. Bonds must be accomplished in area near sparks, flames or high temperature ovens.	Water dispersed adhesive.	To prevent solvent vapors from building up and burning or exploding.	Any type of bonding operation.	Any.
3. Adhesive must lay on surface of porous material without bleeding through.	Semi-gelled, or high viscosity, light colored synthetic rubber base.	To keep penetration to a minimum.	Bond trim cloth or other porous fabrics to steel or other non-porous surfaces.	Spray.
4. Bond between relatively non-porous material must be completed within a short time after applying the adhesive.	Rapid drying solvent type; need force (or heat) drying.	As much solvent as possible must be eliminated before bond is made, to give strength.	Heavy rubber sheeting to steel. Adhering gaskets. Plastic sheet to metal.	Brush, spray.
5. Large area must be coated with adhesive before making the bond.	Very slow drying solvent type, or long open time water dispersion.	To prevent portion of adhesive first applied from drying beyond the stage where it will transfer.	Bonding large thin gage metal sheets to walls or floors or insulation to metal.	Notched trowel or brush.
6. Pieces must be coated with adhesive and stored until needed.	Non - blocking, non-curing solvent type (rapid drying).	So pieces can be stacked in storage without sticking together and adhesive can be easily reactivated.	Precut weatherstrip or gaskets to metal. Vinyl coverings to metal cases, etc.	Roll-coat spray.
7. A sealer must be applied and the unit immediately subjected to heat in a paint drying or baking oven.	Extruded sealer of 100% solids content.	To prevent solvent bubbles from forming within the sealer bead which weakens seal.	Sealing between metal sheets on transportation equipment.	Hand pressure.
8. Adhesive must be applied to metal surface containing a thin oil film or drawing compound.	A special reclaimed rubber water dispersion capable of absorbing oil.	In order to obtain a bond, adhesive must penetrate oil film and come in contact with metal.	Automobile roof pads, sound deadening pads on metal furniture.	Brush or spray.
9. Metal-to-metal bonding with extremely high strength required.	Dry film adhesive, bond made under heat and pressure.	To eliminate all possibility of trapping solvents and weakening bond.	Aircraft skins. Honeycomb structures.	Hand applied.

8. ***All adhesives are the same and are highly limited in use.***
Reason: When rubber based adhesives were first introduced on the market they were limited to those using reclaimed rubber as the base material. All such adhesives provide only a moderate resistance to temperature extremes, and are quickly affected by solvents and oils. They are also one of the lower-strength types of rubber based adhesives. Those who are familiar only with this type of adhesive have the mistaken belief that all flexible adhesives have the same properties.
The Facts: There are presently available to industry dozens of different types of adhesives, and dozens of modifications of each type. Present day adhesives are based on a variety of resins and natural or synthetic rubbers each imparting a different set of characteristics to the adhesives.
So called "tailor-made" adhesives can be obtained which will not be deteriorated at 500° F, and some which will remain flexible to −100° F. Adhesives are available that will provide shear strengths of nearly 2 tons per square inch, or are so low in strength that they can be used for temporary bonding only. Some types of adhesives will resist constant submersion in oil, aliphatic or aromatic fuels, water or various chemicals.
All adhesives are definitely not the same.

9. ***Adhesives are not dependable.***
Reason: Bond failures experienced by first users of adhesives, due mainly to improper application of adhesive or the use of the wrong adhesive for the job, have given the impression that no adhesive will give a dependable holding action.
The Facts: Adhesive bonds made properly years ago still show no signs of failure. Accelerated aging tests, actual weathering tests and countless laboratory tests have shown that adhesives are just as dependable as mechanical fastening methods. Furthermore, flexible adhesives will not jar or shake loose, will "give" with the expansion and contraction of metal without tearing or weakening the joint, and will hold up under conditions of corrosive surroundings.

Fig. 1—310 stainless steel parts containing continuous carbide networks cracked during the drawing operation

Carbides in 310 Stainless

Work shows conditions that cause severe carbide precipitation include annealing temperatures of less than 2050°F and slow cooling from the heat treating temperature

PRECIPITATION of complex chromium carbides from Type 310 stainless steel can be traced to rolling and processing practices at the mill.

Trips to mills showed wide variations in practice. Some were hand mills, while others were of the continuous type. Some were water quenching the sheets as they came from the annealing furnace. Others water sprayed the rider sheet on which the 310 sheet was being carried through the furnace. Naturally, the latter gave less effective quench than the former.

At one hand mill, they found stacking sheets while hot retarded cooling and allowed carbides to form. Air quenching of the sheet was not sufficient to prevent chromium carbide formation.

Others—In the continuous mills, some were able to water quench the material as it came out of the furnace. Others were unable to effect quench close to the furnace, owing to equipment or design limitations.

At one mill the material was allowed to fall into a deep catenary shape while going through the annealing furnace. While the part of the furnace that was level with the normal entrance and exit of the sheet was at proper temperature, the zone at the lower end of the catenary was below proper temperature and could give improper heat treatment, unless the depth of the catenary was reduced to a minimum. Annealing temperatures from 1950 to 2100° F also were being used by the mills.

When all of the variables are added together in various combinations, the picture becomes quite complex. Because several mills produced consistently good material while others had frequent heats with heavy carbide networks, it was indicated that proper combination of good mill practices would give good material and that any variations from this could cause trouble. High annealing temperature and rapid quenching all during the rolling sequences seemed to give best results.

Observations—It appeared that once carbides formed during any stage of the operation they usually were not redissolved by normal mill processing. This was indicated quite strongly by examination of material from one source. They claimed the carbide network in their material was not harmful —because it existed around the primary grains rather than around the recrystallized grains, resulting from later rolling and heat treatment.

Microstructures did indicate this condition might exist; however, subsequent tests showed that bad performance in forming and pickling could be encountered even in material where the carbide network existed around primary grains.

Many heats of material with severe carbide networks did not appear to be adversely affected by Strauss, or Huey corrosion tests. Yet, occasional heats would be encountered that looked the same under the microscope but gave bad production performance.

For example, a number of heats were received that had C5 or C6 carbide rating. During the forming of simple parts, the material cracked (Fig. 1). Same material, when placed in the pickle tanks after forming, developed the typical granulated sugar surface ap-

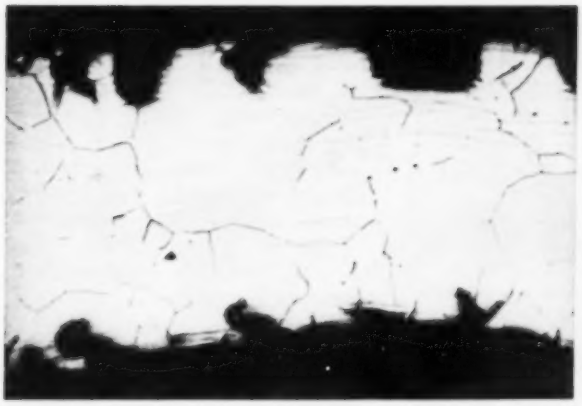


Fig. 2—Cross section of production part etched severely in normal pickling operation. Magnification is 100x

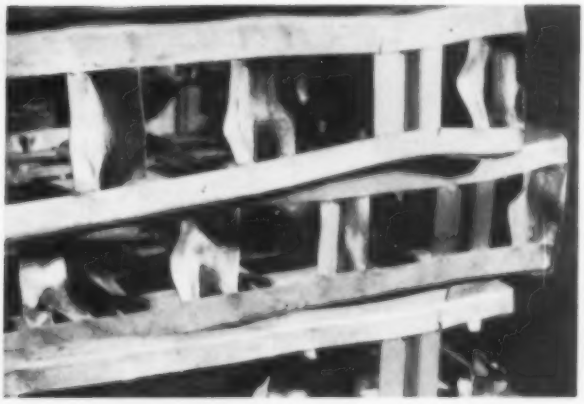


Fig. 3—Heat treat baskets made of sensitized 310 stainless steel failed after four days service at 1950° F

Steel—Part 2

By HIRAM BROWN
Company Chief Metallurgist
Solar Aircraft Co.
Des Moines, Iowa

pearance indicative of sensitized material attacked by corrosive media.

Etching is frequently severe enough to cause rejection of the parts—Fig. 2 shows a cross section of a production part etched severely in the normal pickling operation. The original sheet thickness was 0.028 inch, and after pickling it was 0.015 inch. Note, also, stress raisers and notches resulting from the corrosive attack. Large dark areas may represent spots where entire grains have dropped out.

Application—We use a great deal of 310 for heat treat and pickle baskets. Normally, they last 4 to 5 weeks, operating at 1950° F in a controlled atmosphere furnace. One batch lasted only 4 days in this same type of service—see Fig 3. The single strip of unaffected material in each basket (second from extreme right edge in Fig. 3) is 347. It ordinarily would fail long before the 310.

Apparently, the 310 was sensitized by carbide precipitation, so that grain boundary corrosion and oxidation resistance were severely lowered. Photomicrographs of the original material used to make these baskets showed a carbide rating of C6.

Some of this same material was used to make several pickle baskets for cold pickle acid tanks containing a sulphuric, nitric and hydrofluoric acid mixture. Normally, we obtain many weeks of service from such baskets. However, they failed after only a few days service, owing to intergranular corrosion and embrittlement typical of a sensitized stainless steel exposed to corrosive media.

Other heats of 310 were selected, which had both continuous and noncontinuous carbide networks. Strips cut from each were wired to normal heat treat and pickle baskets, and allowed to remain on during many days of normal operation. None showed the deleterious effects mentioned above. This raised the question: Why did most heats that showed continuous carbide networks fail to cause processing difficulties, while a few with the same apparent degree of carbide network gave serious trouble?

Theory—We still don't know for sure, but have ventured to put forth a theory. Since chromium is the element that contributes to

CHECK POINTS FOR USERS OF 310 STAINLESS STEEL

Mill practices for 310 vary considerably.

Type 310 stainless is sensitive to processing and fabricating techniques that tend to precipitate chromium carbides.

Low solution heat treat temperature, slow cooling and stacking of material during heat treatment can sensitize 310.

In-process annealing and stress relief, even for relatively short time, at temperatures in the range 1200 to 1650°F cause continuous carbide grain boundary networks to form.

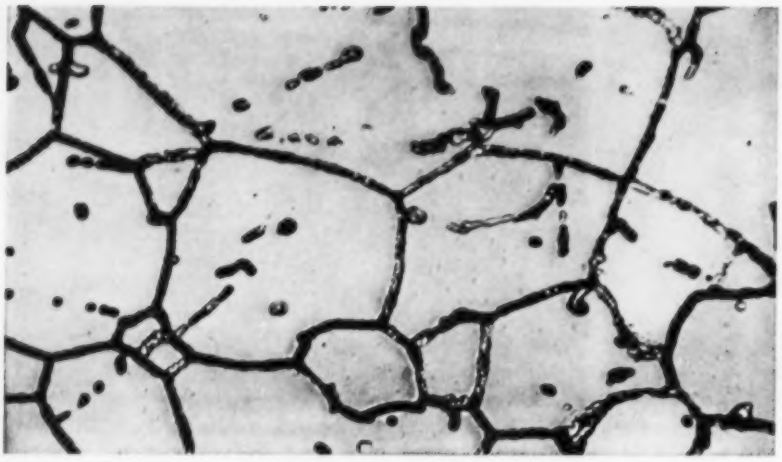
No correlation between carbon content and sensitization of 310 was found, all other conditions being equal.

No correlation between normal physical test properties and carbide network severity was found.

Actual shop processing, such as forming and pickling, showed variations in performance of materials which appeared similar under the microscope as far as carbide rating was concerned.

No 310 having C4 or better carbide rating gave any fabricating diffimulties such as breakage or etching during pickling.

Sensitized 310 could be desensitized by heating to 2150° F and water quenching.



This sample of 310 was sensitized by holding for two hours at 1200°F. Magnification in this case is 750x

making steel stainless, the localized areas near the grain boundaries, when depleted of chromium, will have lowered corrosion resistance. It is possible that when chromium carbides are formed late in the mill processing, sensitization occurs and is accompanied by the difficulties normally associated with sensitized material.

However, if carbides form early in the mill processing, the subsequent heat treatments may diffuse chromium from the remainder of the grain into the depleted area without dissolving the carbides. So, while the microstructure would look the same, the diffusion of chromium may have restored the corrosion and oxidation resistance of the areas adjacent to the grain boundaries.

Since low heat treating temperatures and slow cooling can cause carbide precipitation, it was reasonable to expect that improper shop practice also could cause trouble where in-stage annealing was involved.

Subsequent shop tests showed that severe carbide precipitation could be caused by: (1) Annealing temperature less than 2050° F; (2) slow cooling from heat treat temperature; (3) stacking of parts during heat treatment, so that circulation of air was restricted during heating and cooling; and (4) occasionally by carbon containing water soluble drawing compound left on during heat treatment. The first three can be easily corrected by proper practice. The fourth factor was more complex since it did not occur consistently.

Correction—A great deal of investigation showed that if 310 heats with carbide rating of C1, C2, C3, or C4 were coated with water-soluble drawing compound and heat treated in our normal controlled atmosphere furnace (neutral or slightly reducing), no carbide difficulty was encountered.

However, if material with rating of C5 or C6 was treated in this same way, pitting could occur during pickle after similar heat treatment. The carbon picked up from the coating was apparently enough to accentuate the carbide networks and sensitize the material. This points out the necessity of trying to obtain 310 without continuous carbide networks—C4 or better—in the as-received condition.

In shop practice it was found that most heats of material received with C6 carbide rating could be desensitized by holding for 30 minutes at 2150° F and then quenching in water. This restored both forming ductility and corrosion resistance.

More Tests—Since normal shop processing involves in-process annealing and stress relief, in addition to solution heat treatment, experiments were made to demonstrate how precipitation of chromium carbides can be effected in normally carbide free 310. Tests were performed during which the material was progressively sensitized by improper heat treatment.

Even completely solution heat treated and quenched 310 will form continuous carbide networks if subsequently held at 1650° F for as little as 30 minutes and air cooled.

Sensitization was effected at temperature as low as 1200° F when material was held at this temperature for periods ranging from 30 minutes to 2 hours. A continuous carbide network formed. After standard 48 hour Strauss test, this sensitized material, when bent, cracked severely. Efforts to properly polish and etch this bend specimen were unsuccessful, because many of the grains actually fell out or pulled loose during polishing. Acid attack had severely corroded the areas adjacent to the grain boundaries and left many grains isolated.

CARBIDE ETCHANTS AND TECHNIQUES

Oxalic Acid: Saturated solution of oxalic acid in water at room temperature. Electrolytic etch 4 volts for 10 seconds.

Glyceregia: 1 part nitric acid—2 parts hydrochloric acid—3 parts glycerin—dipped 35 seconds with solution at 140°F.

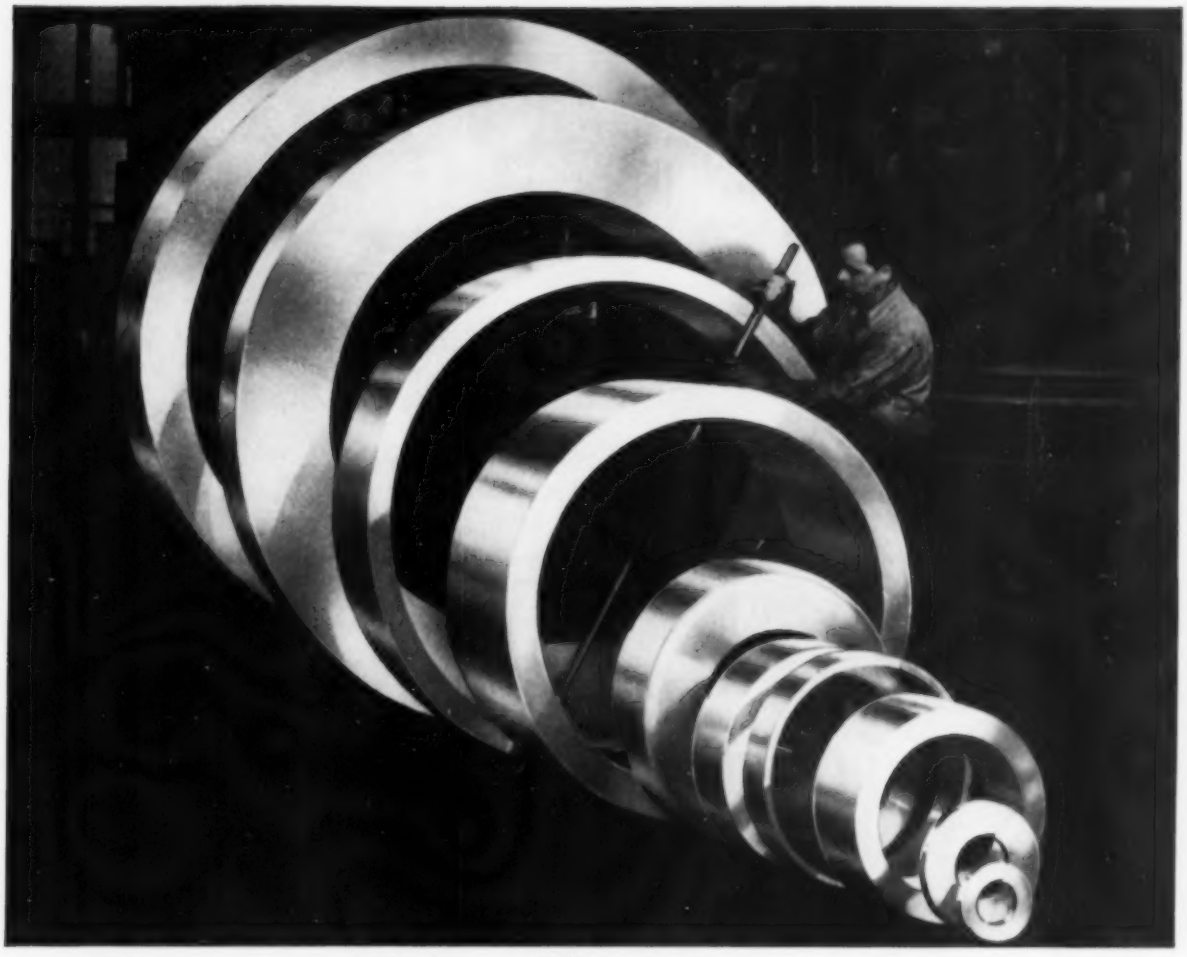
Chromic Acid: 10 per cent chromic acid in water at room temperature. Electrolytic etch 2 volts for 10 seconds.

Sodium Cyanide: 10 per cent sodium cyanide in water at room temperature.

Fry's Reagent: 40 ml hydrochloric acid, 30 ml water, 4 grams copper chloride ($CuCl_2$), and 25 ml ethyl alcohol. Dipped for 10 seconds at room temperature.

Marble's Reagent: 20 grams cupric sulphate, 100 ml distilled water, and 100 ml concentrated hydrochloric acid. Dipped for 30 seconds at room temperature.

This is the second of two articles on the subject by Mr. Brown. First appeared in last week's edition of STEEL.



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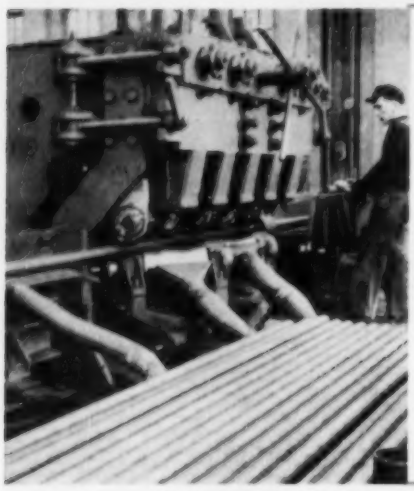
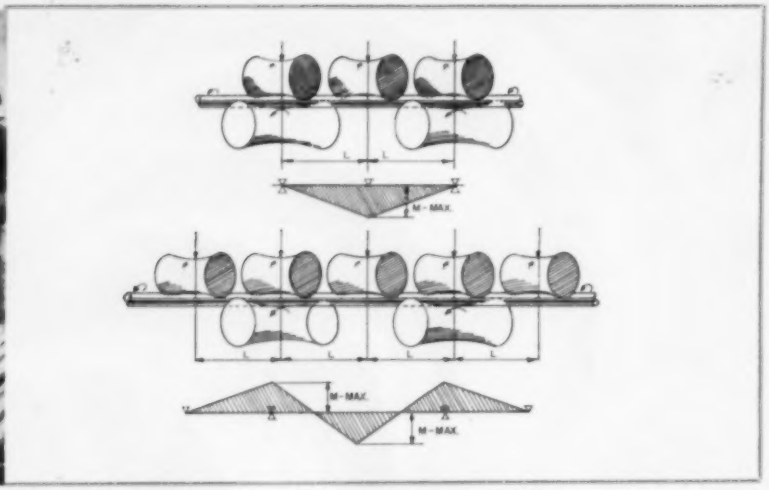




At left, a view of the seven-roll straightener in operation. At right, drawing shows action of five and seven-roll straighteners. Latter bends three times in one pass

One Pass . . .

THREE BENDS IN SEVEN-ROLL STRAIGHTENER

A NEWCOMER among builders of cold straightening equipment has come up with a line of skewed-roll machines having seven rolls. Mannesmann-Meer Engineering & Construction Co., Easton, Pa., reports its vertical seven-roll straightener is capable of cold straightening all kinds of tubing and solid bars, including thin-wall nonferrous tubes, with excellent surface finish.

Normally the two lower rolls are driven and there are five idling pressure rolls arranged vertically to provide a high degree of straightening action. Any or all of the five upper pressure rolls can be driven if desired. Rolls are ground with hyperbolical contour to suit range of sizes and type of material to be straightened.

Reason Why—Satisfactory cold straightening requires bending the material in all directions perpendicular to the longitudinal axis of the tube or bar. Either the material or the machine itself must rotate, and the best course seemed to be rotating the material. By skewing the roll axis into a position about 30 degrees to the longitudinal axis of the material, rotation is accomplished.

To achieve best performance from this design, seven rolls that bend the material three times in one pass, instead of once, as is the case with the 5-roll machine are employed. Assuming the same roll pressure on the top rolls, the latter machine with its three top rolls subjects the material only once to a bending moment of M max, while the 7-roll straightener with five top rolls having the same pressure subjects tube or bar three times to the same moment.

Roll Shape — Hyperbolic shape of the rolls provides for extra contact length between roll surface and workpiece. In addition to a satisfactory straightening effect, this results in a polished material surface.

Rolls normally are made of chilled iron with degree of surface hardness selected to suit the kind of material to be straightened.

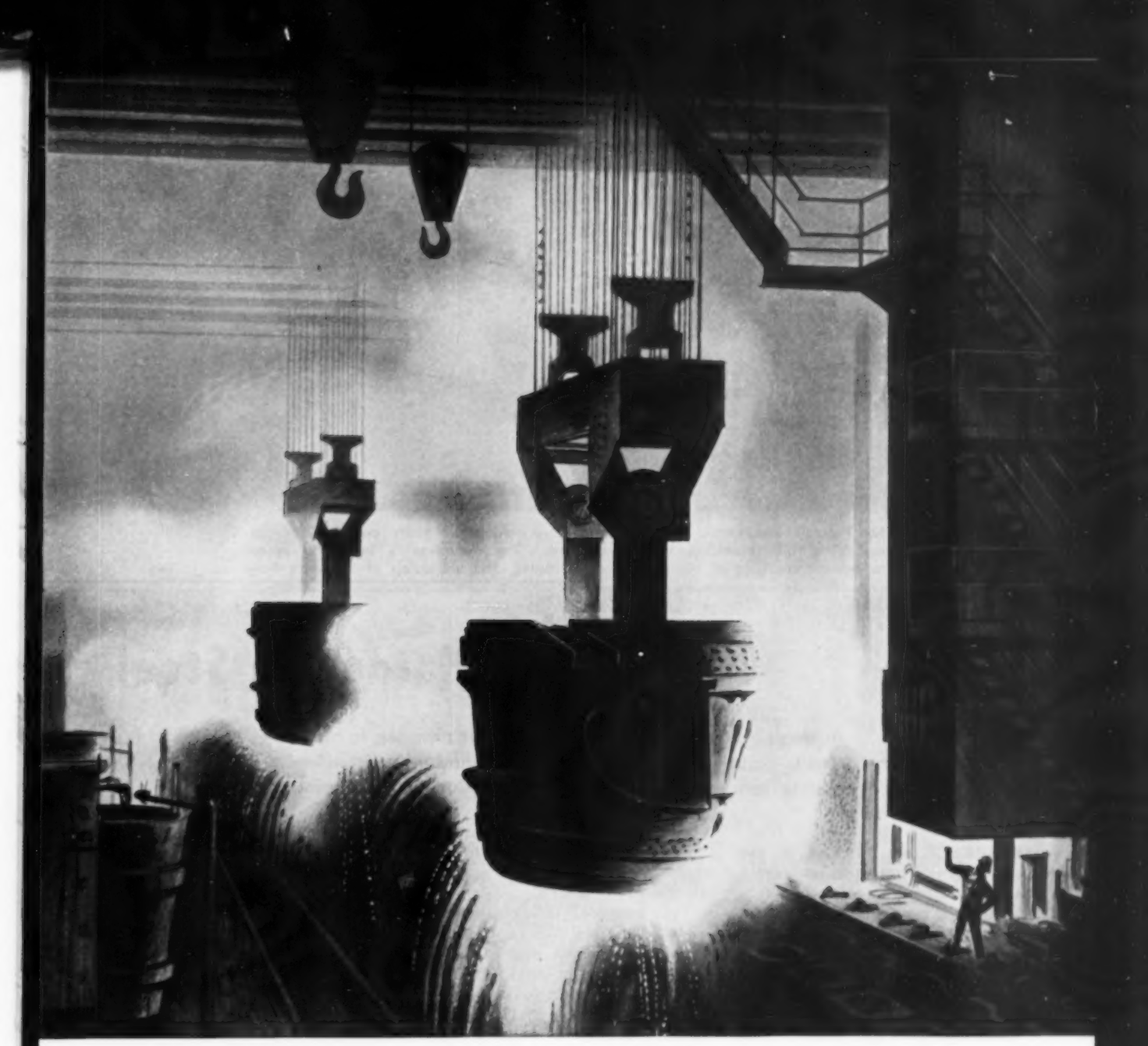
The depth of hardness allows for reconditioning the roll surface several times.

Size Range — Economical cold straightening requires that a wide range of sizes be covered by one set of rolls. These conditions are met by making the roll inclination adjustable to suit the workpiece diameter. Difference between theoretical requirements and actual conditions is so slight that one set of rolls can provide excellent cold straightening at a ratio of maximum to minimum workpiece diameter up to 5 to 1.

Essential roll inclination adjustment is performed by hand through a worm gear. A scale gives relationship between workpiece diameter and inclination angle.

The top rolls are adjusted automatically to the inclination angle of the powered bottom rolls when vertical position of the top rolls is changed to suit corresponding workpiece diameter.

Know-How — A new company, Mannesmann - Meer depends for much of its basic design and technical information on Maschinenfabrik Meer AG, Gladbach, Germany. The latter company has been in the cold straightening field for 25 years, and this latest development represents an accumulation of contributions and improvements that they have initiated over the years.



MORGANIZATION...way to cut costs

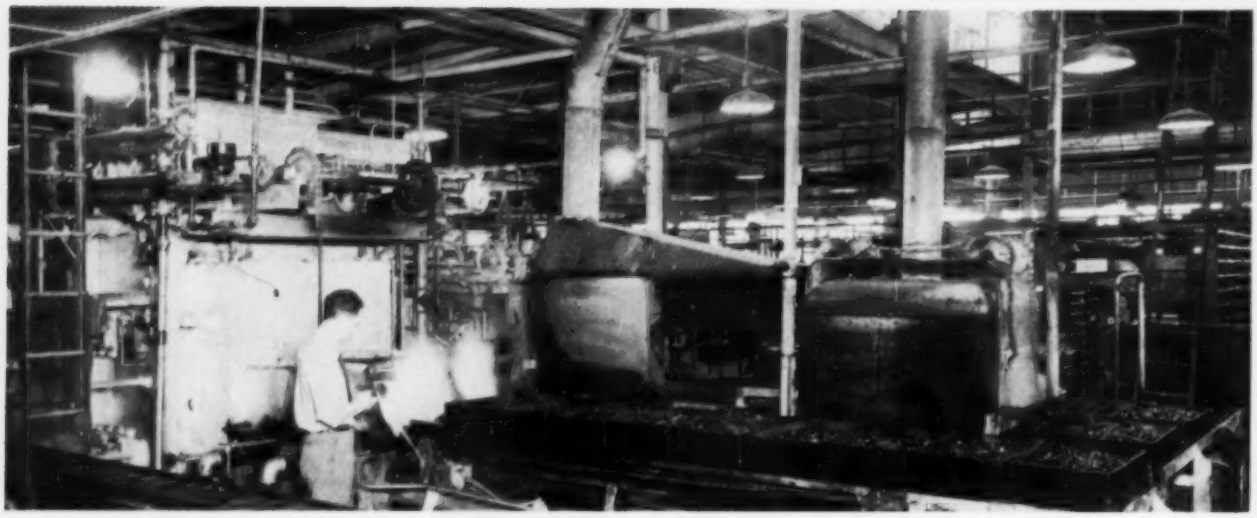
They expected a minimum of 20 years of service from the special-purpose Morgan crane we built for their steel mill. Already this steel company has received 39 years of service, almost double the expected life... and the end is still nowhere in sight. And, of course, the yearly expected cost of operating the crane has been reduced.

This is a typical result of "Morganization"... surveying, designing, building, and installing with the experience and *extra care* that make Morgan cranes and rolling mills and special equipment *last a lot longer*... and that make Morgan equipment cost less over those added years.

Write for booklet S-7, which describes "Morganization" and Morgan equipment for heavy service.

MORGAN ENGINEERING

THE MORGAN ENGINEERING COMPANY, ALLIANCE, OHIO



This Holcroft installation for case hardening automotive gears provides for carbonitriding, oil quenching, wash and draw. The operation is automatic except for manual charging of the furnace and loading and unloading of the work trays

Case Hardening Steel

Austenite in carbonitrided cases contains nitrogen in addition to carbon. Increased hardenability and lower transformation range offer savings in metal selection, processing

PRESENCE of nitrogen in the austenite accounts for practically all the differences between a carbonitrided case and a carburized case. (See STEEL, July 5 for No.5 in the series, on carburizing).

Carbon - nitrogen austenite is stable at lower temperature than plain carbon austenite and transforms more slowly on cooling. This means: 1. Carbonitriding can be carried out at lower temperatures than carburizing. 2. Slower cooling rates can be used in hardening.

Carbon-nitrogen austenite also has a lower martensite transformation range which promotes retention of austenite. Quality of retained austenite varies with amount of nitrogen and carbon at different depths in the case.

Since nitrogen added to the case increases hardenability, it may permit substitution of plain carbon for alloy steels in some applications, unless alloy is required for core properties. So, when comparing carbonitriding with carburizing, effect of the nitrogen means that either a slower quenching media is satisfactory or a lower alloy steel can be used.

For example, inexpensive low carbon C1010, C1020 or free machining screw stock, such as C1113, can be hardened in fairly large sections by an oil quench. In straight carburizing, a more drastic quench, perhaps water or brine, may be required for these nonalloyed steels. Often, a drastic quench gives too much distortion. This means an alloy steel is required so the oil quench will work.

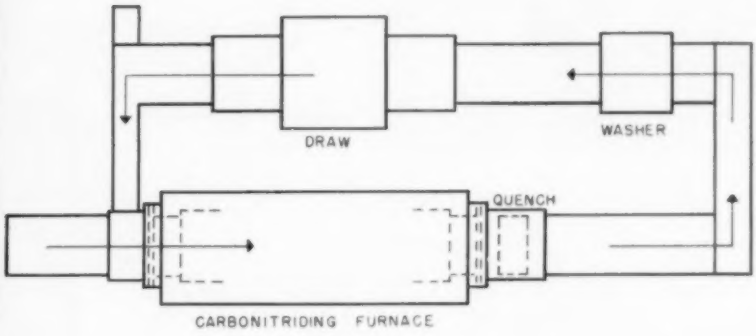
Hold the Line—An auto producer recently set up a process where parts were to be carburized, then taken from the furnace and fixture quenched in Gleason presses by oil. The first few weeks of operation showed that the carburized plain carbon steel parts would not quench out consistently in oil.

Cost involved in using an alloy steel or converting the Gleasons to water was considerable. They tried adding ammonia to the furnace atmosphere. The small amount of nitrogen was all that was needed to increase hardenability of the steel to a point where it would harden out in oil.

Carbonitriding even makes it possible to atmosphere quench the work and still obtain file hardness. While this requires more than twice the furnace time needed for the oil quench method, costly handling and straightening operations can be eliminated where critical shapes must be case hardened without distortion.

Examples—Many types of parts are carbonitrided, especially in the automotive line: Transmission gears, shifter forks and rails, clutch release forks, steering gear parts (worms, shafts, bearing cups, etc.), timing and crankshaft sprockets, oil pump shafts and hand brake levers.

Carbonitrided cases are applied to forgings and sheet metal stampings, such as washers, spacers and bushings. Some other uses: Fasteners-screws, bolts and nuts; ball bearing spacers; valve lifters;



A tray of work is pushed over gravity rolls into the charge vestibule and the outer charge door closed by push button. After the charge vestibule has been purged, the inner charge and discharge doors open and the tray is automatically pushed into the furnace. This moves the last tray into the pull-out position. The pull-out carries the last tray out of the furnace to the quench tank elevator and the furnace doors close. The elevator then lowers the work into the quench tank. After quenching, the elevator raises the tray and the pull-out removes it and advances all trays at the discharge end of the furnace. A pusher then moves the work through the wash and on through the draw

By Carbonitriding

No. 6 in STEEL's MODERN HEAT TREATING SERIES

brake wheel side blocks; and business machine parts.

Steels Used—These include compositions varying from 10 to 40 points or more of carbon in the AISI 1000, 1100, 1300, 3100, 4100, 4600, 5100, 8600, 8700, and 9400 series.

Steels having 0.008 to 0.020 per cent carbon are most common; higher carbon is used for parts that must carry heavy loads such as gears for moderate or heavy duty.

There is an added benefit here too: Their higher core strength makes it possible to use thinner cases.

Bonus Features — How do the distinguishing features of carbonitriding—lower transformation range, greater hardenability, tendency to retain austenite—account for its pay-off?

Take the lower transformation range, for example. It permits a lower operating temperature for carbonitriding than for carburizing.

Result: Reduced distortion and cracking, cheaper furnace operation and maintenance, less grain growth and a softer case.

At a given temperature, rate of case formation is about the same in carburizing and in carbonitriding. Lower temperatures used in carbonitriding give shallower cases.

Happy Medium—In fact, the temperature level chosen is a compromise. On the low temperature side: Less distortion and reduced useless thermal decomposition of ammonia. On the high temperature side: Increased case depth and decreased absorption of nitrogen.

Present day trend toward stronger cores for case hardened parts calls for operation in the higher temperature range. When the pros and cons are added up, the result is still a carbonitriding temperature averaging around 100° F below temperatures used for carburizing.

Quench Easier — Next, look at the greater hardenability of carbonitrided parts vs carburized. A less drastic quench comes into the picture. Here, again, we get less distortion and cracking.

Most carbonitrided parts can be hardened by oil quenching. Sometimes hot salt, hot oil, soluble oil or water may be used. At operating temperatures below 1450° F furnace cooling, air cooling or blast quenching is used.

In many plants, post heat treating operations, such as finish grinding or straightening, have been eliminated by switching from carburizing to carbonitriding.

The lower temperature from which the parts are quenched combined with slower quenching media reduces distortion of parts. So plant men find that touch-up operations are not required. This reflects favorably on the cost per piece figure.

Factors — Hardness of the case depends on the thickness and nature of the compound layer (if present) and the ratio of martensite to austenite in the inner layer. The compound layer resembles the

"white layer" formed in nitriding. It is a carbon-nitrogen-iron compound formed on the surface of parts.

Tendency to produce a compound layer is strongest at relatively low carbonitriding temperatures and high concentrations of ammonia. It can be minimized or even suppressed entirely by operating above 1500° F unless excess ammonia is used.

Case in Point — Here's an example of an operation carried out to give a case made up mostly of compound layer (the exception rather than the rule, however). Parts are cylinder liners of sheet steel. They are case hardened at 1350° F for 10 minutes in an atmosphere of two-thirds ammonia, one-third carrier gas and less than 1 per cent propane.

Then, they are cooled in a blast of furnace gas. Distortion is a minimum. Case is about 0.005 inch and is mainly the iron-carbon-nitrogen compound. This type of treatment is useful for case hardening sheet steel with a minimum of distortion. But, hardness is only moderate and the core is soft.

More Heat—Temperatures above 1475° F are a more general rule. Most popular range: 1550 to 1626° F. Multi-stage processes are sometimes used, say starting at 1550° F or higher, followed by a period at 1400° F or lower.

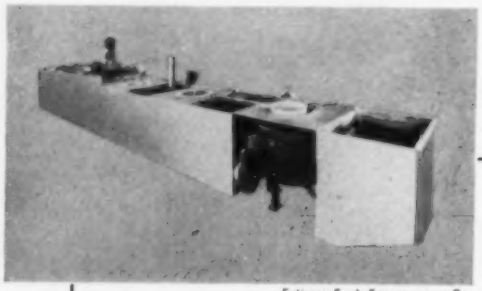
Advantage here: Less distortion. Nitrogen is picked up fast in the first low temperature stage. This is followed by diffusion at higher temperatures. As the carbonitriding temperature increases, the compound layer decreases in thickness and the inner layer contains increasingly more martensite and less austenite. Result: Hardness of case increases too as temperature goes up.

Time — Typical carbonitriding cycles range from 20 minutes to 3 hours. In general, they are shorter than for carburizing. One reason that the thinner carbonitrided cases are satisfactory: There is less distortion, which gives smaller sacrifice of the case in finishing operations.

Versatility — A striking feature of carbonitriding is the variety of conditions under which it is done. One has only to examine operating temperature, time, atmosphere composition and cooling rate for plants around the country to conclude that many different types of useful cases may be produced.

Undoubtedly, lowering of the transformation range with increased hardenability accounts for a great part of this versatility. In modern furnaces, the atmosphere can be adjusted to vary nitrogen and carbon content of the case to meet specific wear resistance requirements.

Gases—As in gas carburizing, methane, propane, city gas or vaporized hydrocarbons supply carbon. Carrier gas is used to reduce sooting and decrease the rate of decomposition of ammonia. Ratio



Eclipse Fuel Engineering Co.

Production line for cyanide salt baths and quenching

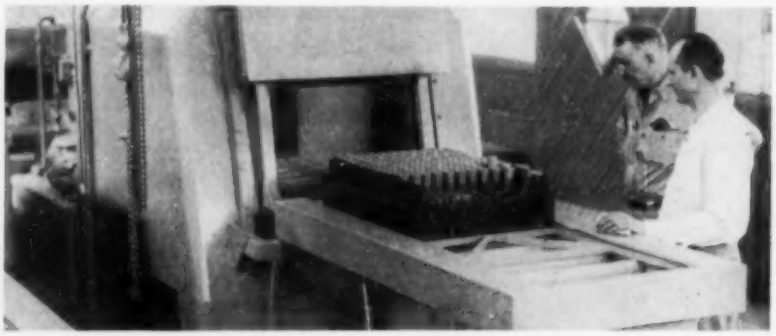
CYANIDING

Simultaneous absorption of both carbon and nitrogen in cyanide baths gives austenites of high hardenability and low martensite transformation ranges. These austenites are similar to those from carbonitriding.

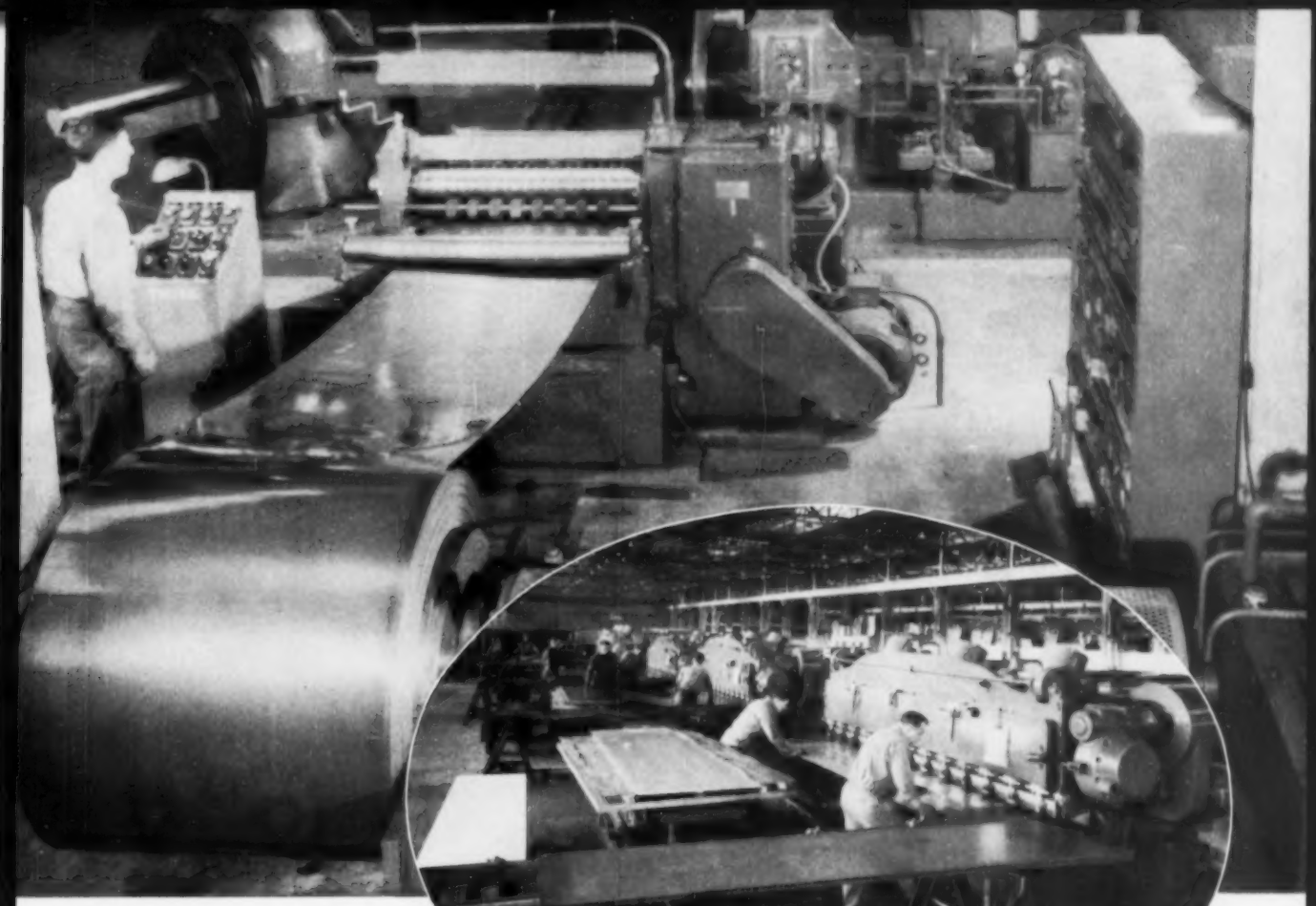
After hardening, the case consists of martensite and retained austenite; latter decreases with decreasing nitrogen content and increasing depth of case same as for carbonitrided cases. Temperature of the bath and amount of sodium cyanide and sodium chloride have a lot to do with the amount of nitrogen in the case.

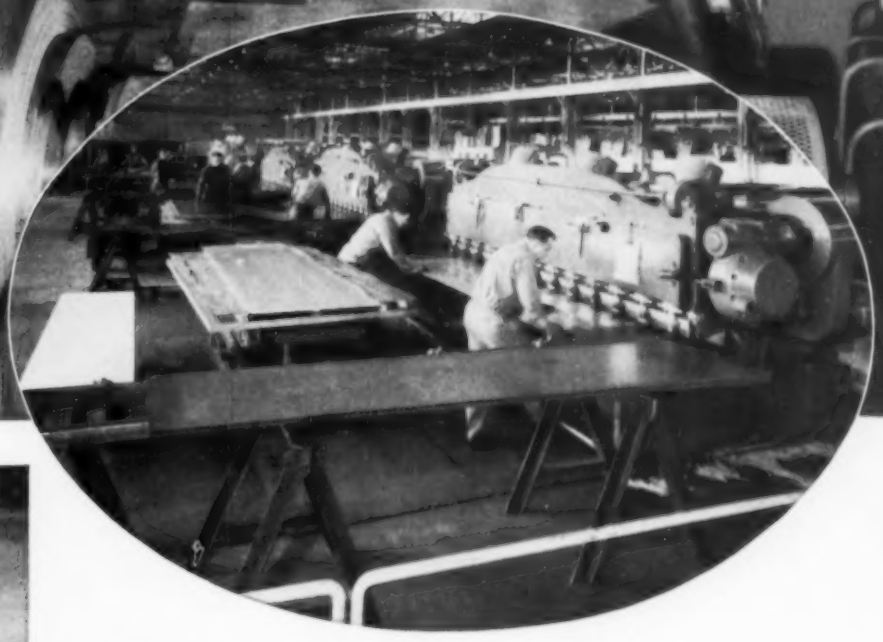
Many plants keep a cyanide pot handy to use interchangeably with carbontriding. Cyaniding pays-off especially on work where volume is low and specifications call for a great variety of case depths and compositions. It fits into the picture where very shallow cases are needed since heat up time is short and case depth can be closely controlled

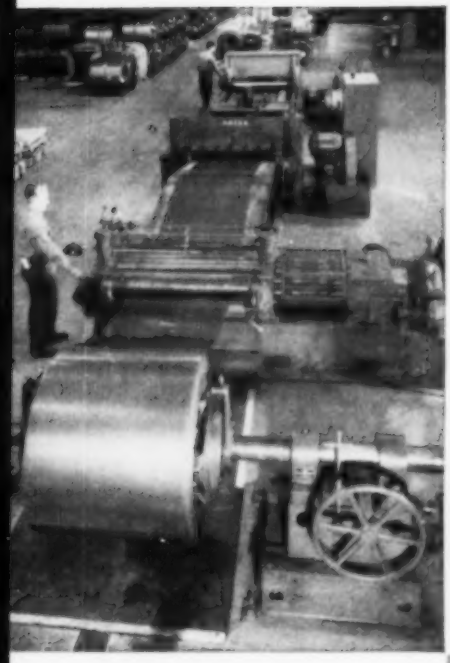
Main factors on the side of carbonitriding vs cyaniding are lower costs for volume production, better working conditions and no disposal problems. Operators have fewer difficulties with intricate shapes in carbonitriding, but for some parts the better support offered by a liquid bath may reduce distortion. For limited capacity, capital outlay for cyaniding is usually less than for carbonitriding.



An Ipsen batch furnace used for carbonitriding screw machine parts at Barmatic Products Co., Cleveland

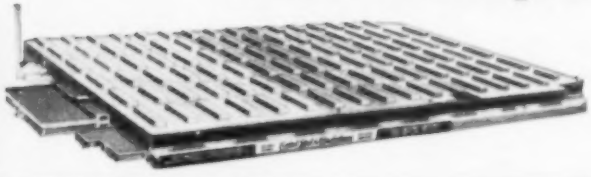






BLANKS

to your exact widths and multiple lengths



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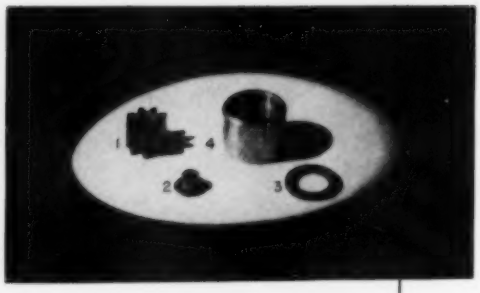


CARBONITRIDED PARTS

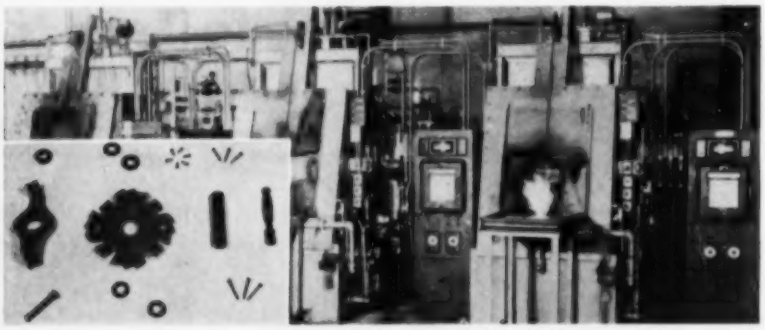
1. **OIL PUMP GEAR**
   Atmosphere: 30cfh natural gas; 5cfh ammonia; 225cfh endothermic
   Conditions: 1700°F; 3 hours at temperature.
   Case: 0.025 to 0.030-inch; Rc 60 min.—file hard.
2. **VALVE SPRING RETAINER** (Former salt job)
   Atmosphere: 10cfh natural gas; 30cfh ammonia; 225 cfh endothermic
   Conditions: 1550°F; 1 hour total.
   Case: 0.005-inch; file hard.
3. **THRUST WASHER** (various sizes)
   Atmosphere: 20cfh natural gas; 20cfh ammonia; 225cfh endothermic
   Conditions: 1500°F; 1 hour at temperature.
   Case: 0.005 to 0.007-inch; file hard.
4. **CRANKSHAFT END SPACER**
   Atmosphere: 30cfh natural gas; 5cfh ammonia; 225cfh endothermic
   Conditions: 1700°F; 4 hours at temperature.
   Case: 0.035 to 0.040-inch; Rc 60 min.

White Motor Co., Cleveland

of hydrocarbon gas to carrier gas is similar to carburizing.

Amount of ammonia bled into the inlet gas varies over a wide range. At White Motor Co., Cleveland, (see box) 5 cubic feet per hour (cfh) of ammonia is used to carbonitride oil pump gears and crankshaft end spacers; with a valve spring retainer part, 30 cfh of ammonia is the rule; with a thrust washer, amount added is 20 cfh.

Many plants operate with an endothermic atmosphere enriched with about 5 per cent hydrocarbon gas, such as natural gas, and 15 to 20 per cent ammonia. In low temperature cycles, more ammonia is used. This results in absorption of considerable amounts of nitrogen in compound and inner layers.



Carbonitriding furnaces at Allis-Chalmers' LaPorte Tractor Works. Inset shows parts treated with this process

Axiom—As a general rule, heat treaters feel that it is good practice to hold the ammonia to a minimum.

This is a matter of economy, and it makes good metallurgical sense to limit the ammonia to that needed for the required hardenability. That way retained austenite is minimized.

Both continuous and batch furnaces are used. Furnace equipment is designed to keep work from contacting the air on quenching, so it stays bright. Modern furnaces are also highly mechanized.

Switch — Generally, carbonitriding can be carried out in ordinary gas carburizing equipment. In continuous furnaces, important point is to have enough ammonia throughout the entire heating zone.

Since carbonitriding cycles are usually shorter than carburizing cycles, flow of work through the furnace may have to be speeded up in the changeover. This has spurred the development of batch type furnaces with rapid heatup time.

Case depth is usually measured microscopically on an etched section. Normal range is from 0.003 to 0.020 inch. Occasionally, a case in excess of 0.030 inch is required.

Factors that determine needed case depth: 1. Dimensional tolerances specified; 2. amount of stock that must be removed due to distortion; 3. total allowable wear during life of the part; 4. stress concentration in service; and 5. lead resisting requirements.

Tempering—Many carbonitrided parts are put into service without tempering. For other applications, tempering is needed to improve the properties of the core or the case. Gears and shafts come into this category.

Parts processed in the higher heat range are more likely to need tempering than those finished at lower temperatures. If the case is mainly compound layer, tempering is not needed. Time of tempering averages 1 to 2 hours, in range, 300 to 1000° F. Higher temperature ranges are for cases containing high nitrogen.

Parts of this article are based on a chapter prepared by M. B. Bever and C. F. Floe, Massachusetts Institute of Technology, for *Surface Protection Against Wear and Corrosion*, to be published by American Society for Metals, Cleveland, O.

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Acme Steel Strapping and Wire Stitching Ideas are yours for the asking

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Acme Idea Men are experienced in solving every kind of packaging problem. They are available at your request to show you in your own plant how modern Acme Steel Strapping or Wire Stitching methods can improve your shipping operations and save you money.

ACME STEEL

Idea #419—A centralized Acme Steel Strapping Machine (automatically tensioning, cutting and welding the strapping) maintains the flow of all sizes of containers at the Chrysler Corp. plant, Marysville, Mich.

AIM → for modernization of your packaging and shipping methods with Acme Steel Ideas

Idea #425—Sillers Paint & Varnish Co., Los Angeles is using an Acme Steel Silverstitcher to speed the assembly of cartons.

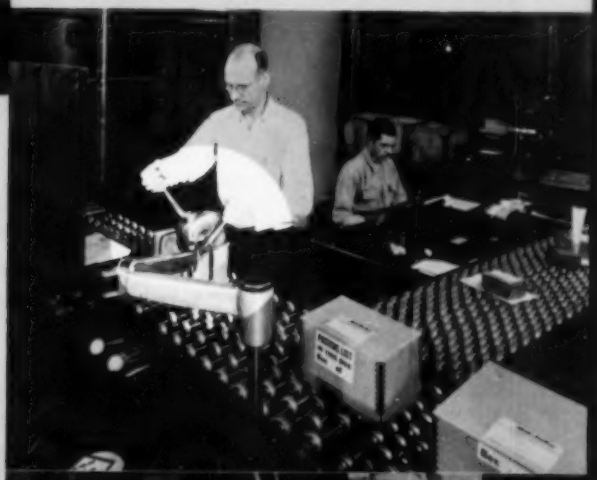
Idea #423—An Acme Steel Pneumatic Stretcher secures sheets of binder's board at The Davey Company, Jersey City, N. J.

Idea #412—Loading time and dunnage costs are reduced, freight costs are lower at Thor Corporation, Chicago, where Acme Steel's "floating load" method is used for carload bracing of appliances.

Idea #414—Modern conveyors and an Acme Steel Pneumatic Stretcher have reduced unitizing time by 25%, cut labor costs by 25%, and increased storage by 90%, at Morris P. Kirk & Sons, Los Angeles, California.

Idea #415—Piece-by-piece handling has been eliminated at Brooks Lumber Co., Bellingham, Wash., by bundling wood products, then bracing in carload units with Acme Steel Strapping.

Idea #416—A 400% increase in packaging capacity has occurred at Firth Sterling, Inc., Pittsburgh where a centralized Acme Steelstrapper maintains the flow of shipments—at lower cost.



Idea #418—Lightweight, durable fibreboard tote boxes are in volume production at Tressel Box Stitching Co., Azusa, Cal., thanks to Acme Steel Arcuate Wire Stitching method.

ask your **A**cme **I**dea **M**an
to apply these ideas to your
shipping problems . . .

Idea #414 – Use of pneumatic stretcher for strapping palletized ingots.

Idea #113 – Strapping dies for paperboard cartons

Idea #126 – End stack bracing for carload shipments of case goods

Idea #411 – Self-palletizing of brick

Idea #124 – Strapping regular slotted containers, end flaps folded last

Idea #115 – Bundling glazed storm windows

Idea #410 – Strapping compressed bundles of textiles

Idea #130 – Bundling mounted tires for export

Idea #122 – Carload bracing of empty cable reels

Idea #407 – Palletizing fibreboard

Idea #128 – Reinforcement of wood pallets

Idea #104 – Palletizing and carloading wax slabs

Idea #415 – Strapping formed, wood pipe staves in carload shipments

Idea #401 – Unitizing lumber for retail delivery

Idea #105 – Palletizing and carload bracing multipacks of television tubes

Idea #111 – Bundling solid fibre newsprint cores

Idea #108 – Skid loading cellophane rolls in carton

Idea #107 – Carload bracing coiled copper rod

Idea #408 – Packaging of impregnated pipe

Idea #133 – Tying protective wrappings to oxygen cylinders

Idea #109 – Bundling and truck loading bee hives

Idea #110 – Strapping rubber onto skids, into palletless units, and carloads

Idea #402 – Strapping rolls of tire cord fabric for overseas shipping

Idea #418 – Wire stitching of fibreboard tote boxes

Idea #112 – Strapping foundry flasks into bundles

Idea #409 – Strapping concrete pipe on flat cars

Idea #131 – Bundling refractory brick for palletless shipment

Idea #123 – Self-palletizing unit of concrete block

Idea #416 – Production-line strapping of cartons

Idea #129 – Skid loading printed material

Idea #125 – Reinforcement of crates for five-gallon water bottles

Idea #403 – Assembling and stitching various size cartons

Idea #127 – Carloading mixed shipment of kegs and cases of beer

Idea #417 – Unitizing heavy, shaped timbers

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ACME STEEL

MACHINE TOPICS

BY R. F. HUBER, *Machine Tool Editor*

SELLING machine tools is like selling life insurance. You can show the prospective customer it will pay him to invest in a certain plan or machine, but nine times out of ten you'll still have to "sell" him before he'll use the dotted line.

It's like this — few men question the wisdom of having adequate insurance coverage, yet almost no one seeks out the insurance agent and asks for a policy.

Sales Conversion—The machine tool salesman (sales engineer) really has two jobs in one. First he must show the buyer that the new machine will increase the flow of dollars into the till, along with proof that the old unit is losing money every hour it operates.

The second job, often the biggest, is converting the need for a new machine into a buyer want. He must want the machine so badly that he'll pay for it. That's not as simple as it sounds.

Help from the Clan — The Machine Tool Sales Conference at Cornell University (week of July 12) covered both phases of the double-barreled job. Jointly sponsored by the National Machine Tool Builders' and the American Machine Tool Distributors' Associations, the session attracted a record-attendance of more than 150 salesmen.

Throughout the 5-day meeting, special emphasis was placed on low-pressure sales and customer service.

Buyer Assist — This customer service, essential to machine tool sales, gives the buyer his extras on the deal. It includes everything from replacement calculations to setup and operator training.

Salesmen attending the conference got pointers on the application of replacement formulas (MAPI and others), proper preparation and presentation of quotations, work simplification to eliminate unnecessary operations, modernization, depreciation, taxes, leasing and follow-through after the order is in the bag. All of these are designed to assist the buyer in getting the right machine in the right place with a minimum of time and confusion.

Better Sales — Conference goers also picked up tips on how to get the most out of their jobs. J. T. Vinbury, advertising manager, New Britain Machine Co., cited the value of market analysis and pointed out some of the methods for determining potential. Russell Dustman, plant manager, Chevrolet — Cleveland Division, General Motors Corp., gave the user point of view on machine tool sales methods and salesmen. C. N. Allen, Dartmouth College, discussed the personality aspects of a selling job.

Now Is The Time

Discussing the importance of good, aggressive sales, Joseph H. Buhr, president, Buhr Machine Tool Co., Ann Arbor, Mich., feels that the machine tool builders with the best sales programs are the ones who'll do the most business in the coming months. It's just that simple. As competition stiffens — sales will make the difference.

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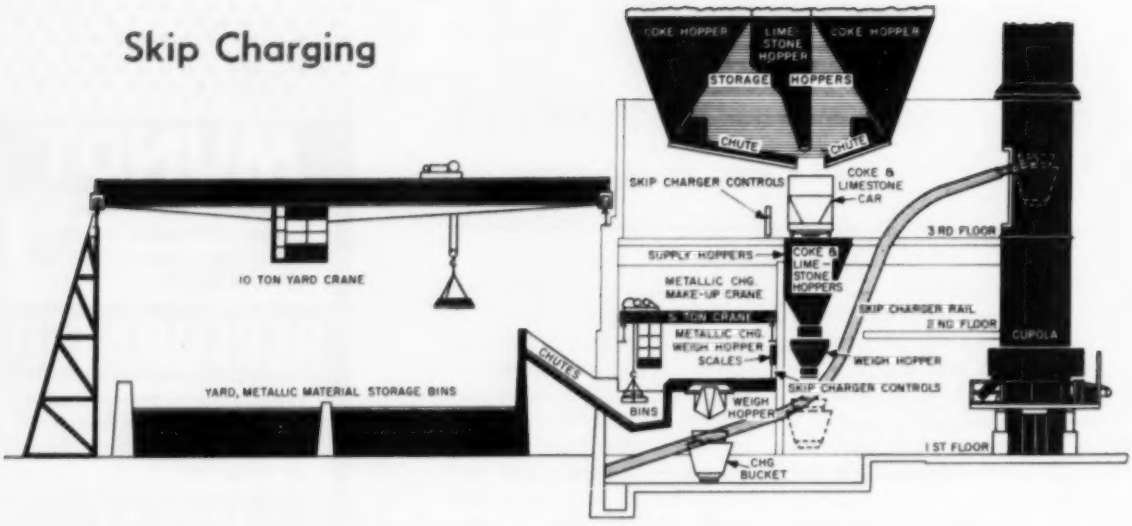


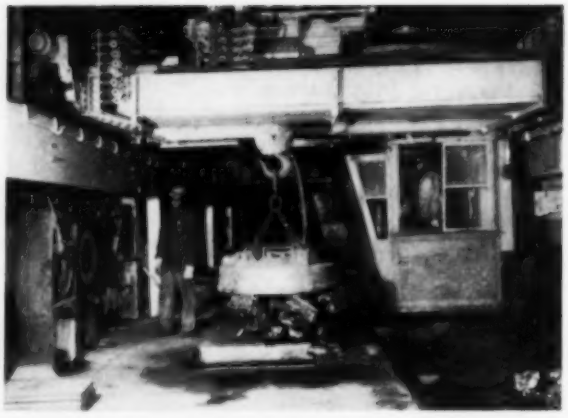
Foundry Handling Goes Automatic

MANUAL CHARGING of eight cupola furnaces—an extremely undesirable job—no longer faces workers at Pontiac Motor Division's foundry. The division's new automatic skip charging system makes the operation painless.

The system employs for each cupola an S-shaped rail and cables to move charging buckets through two loading positions, then up into furnace tops for discharge. It replaces the slower, less economical method of moving the buckets to loading positions by truck and hoisting them by crane to cupola mouths.

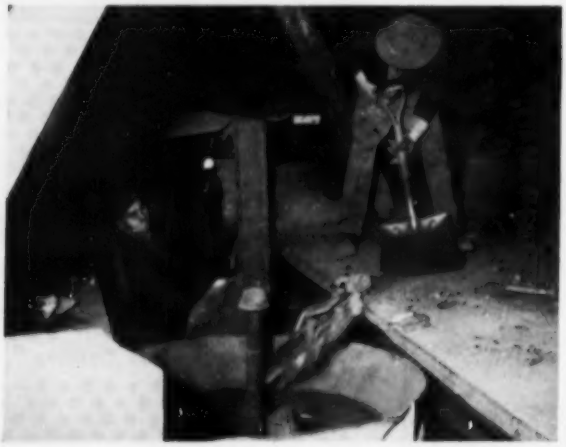
Speed of skip charging allows the buckets to be charged when needed; the old system required that 10 to 15 buckets be kept in reserve at all times.

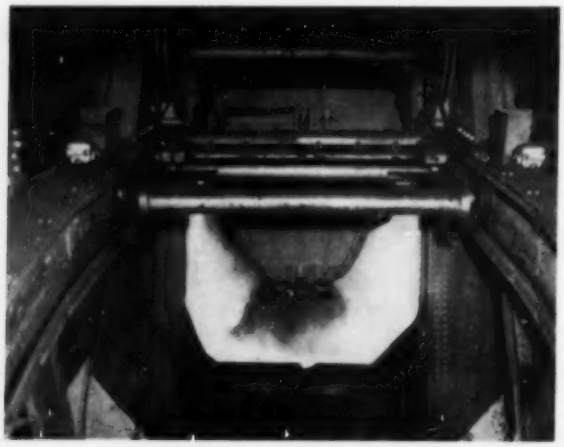
Another advantage: Fewer men to make the system function. In addition, safety of the work is increased appreciably, and quality control of the grey iron is simplified.

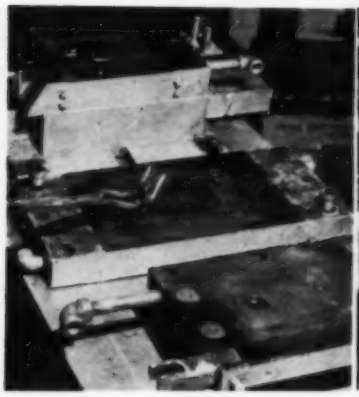


now it's dumped into charging buckets by electromagnet and crane. No manual coke and limestone charging is necessary either. The buckets ride to the charging floor on rails instead of getting hoisted by crane

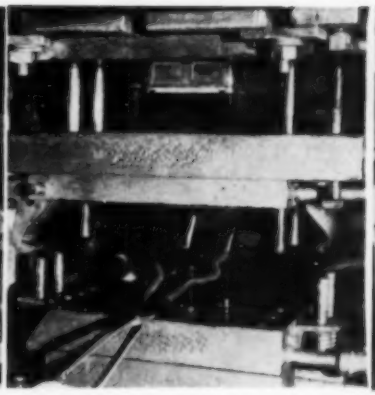
Then and now: Scrap was loaded manually . . .







"Hot" bushing is put into mold . .



Test slug is formed, then . . .

Placed in scintillation counter

Offers New Look at Wear

Limited mold life has been a problem in the forming of plastic products. New technique is being used to find formulations that will keep this erosion at a minimum

PROBING the inner secrets of machinery in action is largely an after-the-fact proposition. If wear is in question, for example, standard procedure is to shut down the machine and take it apart, piece by piece. Now it appears that a peace-time application of atomic energy can supply us with a shortcut.

Pictures on this page show how General Electric's chemical materials department gets inside information on the wear properties of plastics. Abrasive elements in the material wear or erode metal molds in which products are formed. GE's goal is to ferret out offending constituents and find suitable replacements. That way, longer mold life is assured. Conceivably, the problem could be attacked from the other end—that is, finding the metal mold material or design that offers best resistance to wear.

Equipment—You can do this sort of thing if you have way of detecting one part metal in 20 million parts of plastic. Looser specifications do not give you needed details. GE does the job by putting a sprue bushing (a part of the metal mold) in the hot metal pile at Brookhaven Lab, Upton, N. Y.

Using proper handling precautions, the "hot" bushing is returned to its place in the mold, with the idea being that any metal removed in wear will be clinging to the plastic slug cast for the test. To make this check, the slug is placed in a scintillation counter; and, as stated, one part metal in 20 million parts plastic can be detected. Formulations showing wear are changed until desired improvement is noted. A new formulation can be checked within the hour of its conception.

How practical is this technique? Wyman Goss, manager of GE's phenolic engineering laboratory, says: "Sufficient information already has been obtained to enable us to formulate plastic molding materials that are extremely low in erosion rate. They are in production on a limited scale. Full-scale production on some items should come during the third quarter of 1954."

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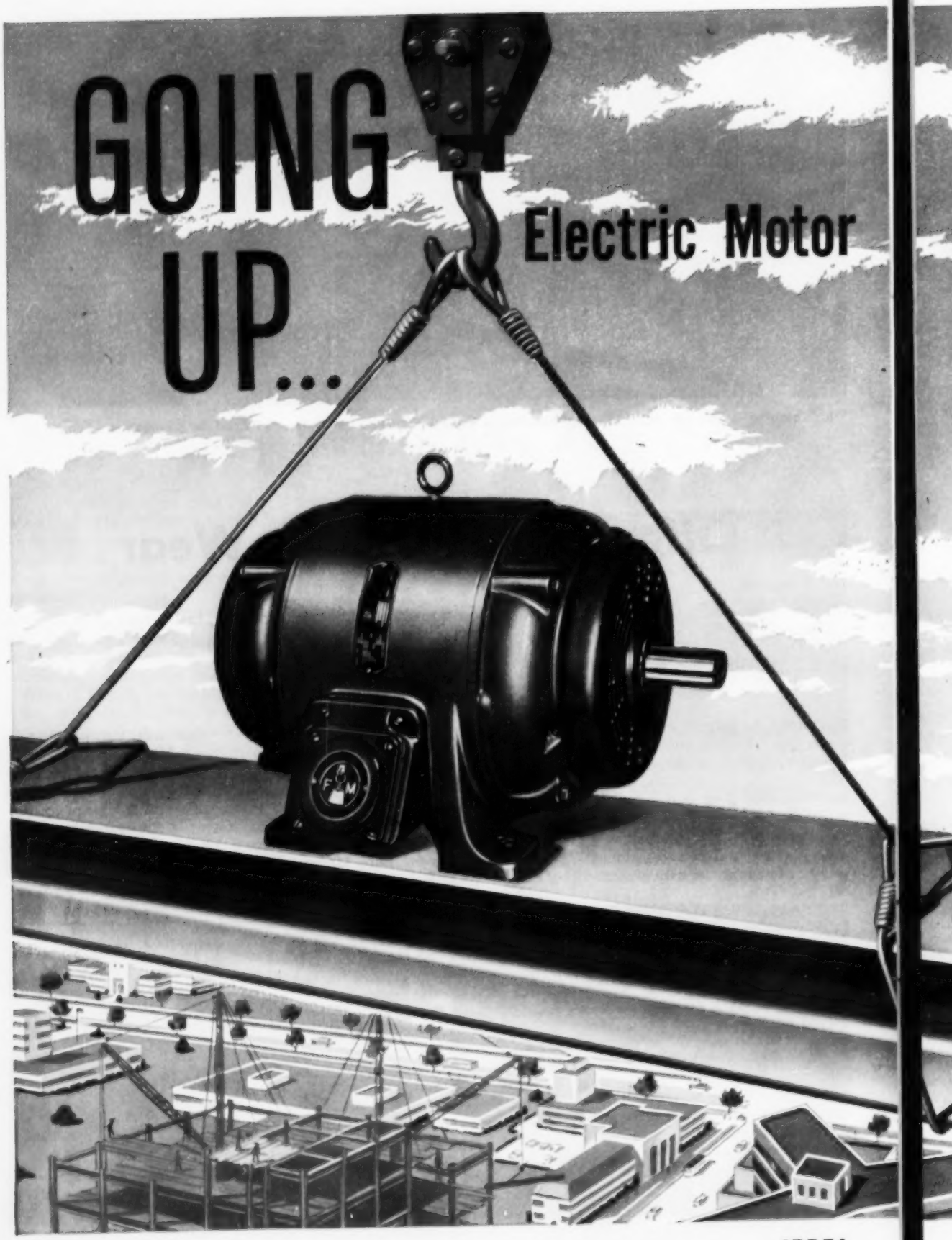
4.5	Mn—100% Mn^{55}, yielding Mn^{56}, with half life of 2.59 hours
1.7	C—No radioactivity
94.38	Fe—3.3% Fe^{58}, yielding Fe^{59}, with half life of 45 days.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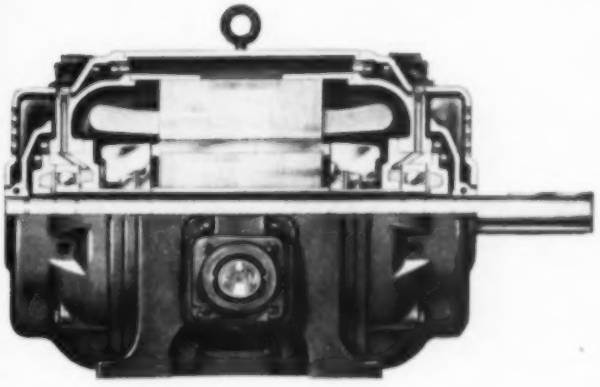

TOTALLY ENCLOSED—Wherever adverse operating conditions are encountered, F-M totally enclosed construction effectively insures electrical parts and bearings against contamination by dirt, abrasive dusts, metal particles, corrosive gases and steam.

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CONDUIT BOX—New, gasketed, cast iron conduit box permits easy pulling of cables without insulation damage. Fairbanks-Morse exclusive: recess feature allows elimination of conduit box where space is limited.

BEARINGS—Precision ball bearings are effectively sealed against grease leakage and contain ample lubrication for extended periods of rugged service. Convenient means are provided for flushing and relubricating if desired. Cartridge bearing construction is standard on all larger ratings.

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CHROMETEX—used 4 oz./100 gallons in acid dip prior to decorative chrome plating. Aids in covering deeply recessed parts with chrome.

Other specialties used in very small proportions for: chemically machining aluminum—eliminating cyanide staining —stripping metals from diecastings—deburring steel articles chemically in bulk—preventing copper from tarnishing—pickling titanium—stripping nickel from stainless steel and aluminum—eliminating acid spray in anodizing solutions—desmut aluminum eliminating nitric acid —replace high cost of fluoboric acid with a dry salt—eliminate use of hydrofluoric acid by use of a dry salt—bright dip beryllium copper.

These and many more chemical specialties, along with application know-how, are yours for the asking. Write today for a MacDermid Chemical Engineer to call on you.

OVER 32 YEARS SERVICE TO THE METAL FINISHING INDUSTRY!

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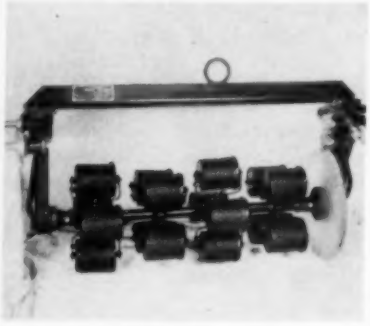
Plating Small Parts

A PLATING PROBLEM inherent in the office machinery business is the need for manufacturers to plate millions of small parts and types which cannot be mixed. This means plating always in small, well-separated batches, yet on a large production scale.

Hit and Miss—In one recent example, a manufacturer was using an egg-shaped perforated steel container, about 5 inches in diameter, plastisol-covered. These small containers were made in halves and fitted with a threaded center bolt.

A length of steel chain, about 3 inches long, attached to one end of the container picked up the cathodic current. Loaded containers were placed into the standard



CLUSTER BARREL
. . . constant current to containers

barrel plater and tumbled with other work. Under such a procedure, the only time this particular work could be done was when a barrel loaded with other work was operating. Special containers were so bulky that production was limited and inevitable hit and miss contact led to poor plating.

Rotary Rack—A rotary rack to hold small containers, part of the Udylite cluster barrel, now means proper constant current is conducted to each container. The mechanism, which consists of a shaft rotated by a large ring gear, does the small-parts plating job thoroughly. On the shaft are mounted at intervals of about 8 inches four spoke arrangements. Each carries a perforated steel plastisol covered container held in place by C-shaped spring clips which also serve to hold the lid in place.

NEW PRODUCTS and equipment

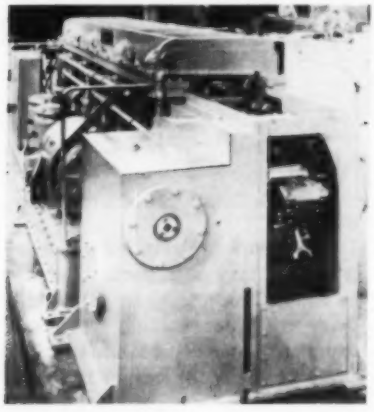
Reply card on page 123 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Continuous Broaching Machine

. . . rate: 900 parts per hour

A new horizontal-type continuous broaching machine hits a production rate of 900 parts per hour by end broaching sides, face and half-round of an automotive connecting rod, operating at minimum speed.

This same machine is capable of



doubling that rate. In this example, the part is the customary steel forging, with amount of bar stock removed being approximately ⅛ inch per surface.

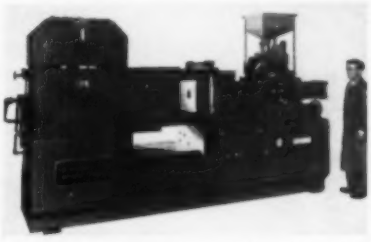
Built with a 120-inch stroke, the machine is powered by a 30-hp motor. The machine stops automatically if anything occurs to interfere with normal operation. It has a chip conveyor attachment for continuous chip removal. Lapointe Machine Tool Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 1

Plastic Injection Molder

. . . fully-automatic molder

A fully-automatic 6 to 8-ounce capacity injection molding machine will cycle up to 400 times an hour, depending upon molded part design. One attendant can operate four to six machines. Application is aimed at the packaging industry, where thin walled



containers are in considerable demand. Other end uses include lighting fixtures, small electronic parts for the radio and television industry.

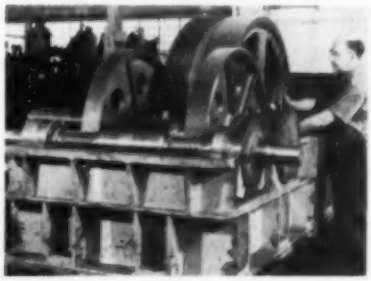
The new machine features a straight-line full-hydraulic mold clamp, with fast-closing and opening speeds and automatic slowdowns prior to mold contact, at mold breakaway and during ejection of molded parts. Hydraulic Press Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 2

Industrial Speed Reducers

. . . thirteen standard ratios

A new line of large industrial speed reducers for heavy industrial application consists of a se-



ries of single (type WSH) and double-reduction (type WDH) units. Thirteen standard ratios from 2.24 to 9.21 are available for WSH; 16 ratios from 11.3 to 70 are available for WDH.

The reducers are of external geared type with shafts arranged in a horizontal plane. Design incorporates compact, rigid fabricated gear cases, precision gears and pinions, antifriction bearings and liberal-sized shafts. Westinghouse Electric Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 3

Improved Centerless Grinder

. . . facilitates automatic cycles

An improved design of the No. 12 centerless grinder retains many production and operating features

of the previous model, but makes improvements to facilitate the addition of automatic cycles and loaders. Workpieces up to 3½ inches in diameter can be ground on this machine using standard work rests. Heavy-duty work rests increase the work capacity to 4¾ inches in diameter.

The redesigned grinder is used for infeed or thrufeed grinding of parts that may be more economically finished by centerless grinding than by center-type operation. This machine can be used for heavy

stock removal or extremely close tolerance work on straight or profiled shape. Landis Tool Co.

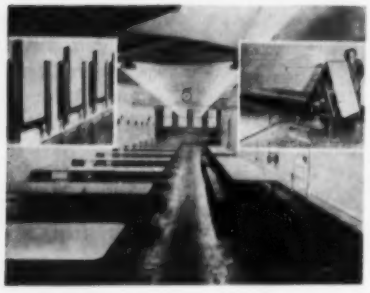
FOR MORE DATA CIRCLE REPLY CARD NO. 4

Lunchroom Space Saver

. . . folding table system

A plant confronted with an employee lunchroom space problem can improve the situation easily and quickly with this system of portable Fold-A-Way tables. Where multi-purpose use of space is essential, such equipment can be the space-saver that is called for.

Two types are available: Portable with benches attached or



wall-attached type with benches attached.

The tables fold or unfold with positive locking action in 15 seconds. Haldeman-Langford Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 5

Aluminized Asbestos

. . . halves asbestos weight

A new line of aluminized asbestos clothing includes complete items of apparel for use where a high degree of protection from heat and radiant energy is required.

The clothing line is made from Underwriters' grade herringbone weave tropic weight asbestos, treated to give it an aluminum coating. Coating on the garment reflects 90 per cent of all radiant energy.

Aluminizing makes possible safe use of lighter weight asbestos, which greatly lessens total weight of garments. The asbestos cloth formerly used was over twice as heavy.

No wetting process is necessary on hot jobs. Metal splash will not adhere to the aluminized finish. Wheeler Protective Apparel.

FOR MORE DATA CIRCLE REPLY CARD NO. 6

Lubricant Spray

. . . moly-disulphide compound

Moly-Spray-Kote is a carefully-compounded dispersion of microfine solid lubricants, principally molybdenum-disulfide, in a propellant Fluron. The carrier is blended specifically for applying a controlled, uniform flow of molybdenum disulfide to metal surfaces by spraying from a self-pressurized, aerosol-type container.

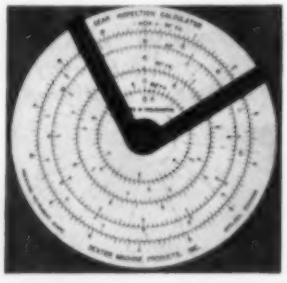
The compound is nonflammable and may be sprayed on hot surfaces. It is noncorrosive and nontoxic and does not contain a resin binder. Alpha Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 7

Gear Inspection Molder

. . . checks pressure angle

This handy gear inspection calculator was developed by Dexter for determining relationship between tooth thickness and radial



displacement and total composite error for pressure angles of 30, 20 and 14½ degrees when the gear is inspected on a gear rolling fixture.

Calculator design is based on the fact that changes in tooth thickness and radial displacement when rolled with a master gear are both functions of the pressure angle.

The plastic gear calculator is 5 inches in diameter, sells for $3. Dexter Machine Products Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 8

Precision Boring Machine

. . . for production contouring

A cam-operated machine, built for precision finishing work, is an addition to Ex-Cell-O's line. Cam followers of the style 312 impart the rise and fall of the cams directly to the machine table and cross slide. There are no levers.

The model is designed essentially to accommodate parts than can be rotated on one or more spindles while the nonrotating tools are supported on the cross slide. Machine is ideal for production contouring work in which forms must be reproduced over and over again within close tolerances. Such forms can be inspected by checking only one dimension, because accuracy and relationship of other dimensions are determined by the cams. Ex-Cell-O Corp.

FOR MORE DATA CIRCLE RTPLY CARD NO. 9

Power and Speed Control

. . . meets needs of fhp drives

A line of combination power and speed control units has been engineered to meet specific needs of fractional horsepower drives. Known as fractional horsepower Adjusto-Speed drives, the units are an integral combination of ac constant speed induction motors, eddy-current couplings and electronic speed controls. They are

Enthonics AT WORK Protecting Zinc, Cadmium, Copper, Brass, Steel

ENTHONE CORROSION PREVENTIVES

Stand up to Salt Spray

At Enthone our sole aims are the development of better methods for the improvement of metal finishing and the reduction of finishing costs. These we have accomplished in the field of corrosion prevention. Our research chemists and engineers are responsible for the following outstanding metal finishing products for the prevention of costly corrosion:—

ENTHOX: Puts iridescent, gold-colored chromate coating on zinc and cadmium. An excellent base for organic finishes. Highly resistant to corrosion; withstands salt spray from 100 to over 1000 hours.

COMPOUND 39: A one-operation phosphating and cleaning compound for steel and zinc. Fine grained, highly adherent phosphate coat is ideal base for organic finishes. Gives high bond strength.

EBONOL "C": Gives jet black cupric oxide coating to copper and its alloys. Chemically stable; heat stable; very adherent. Fine base for organic finishes. Readily withstands salt spray.

COMPOUND NR-31: A rustproofing agent for iron and steel. Leaves thin surface film that prevents rusting when drying water off metal or when storing parts in water. Quickly removed by rinsing in water.

COMPOUND NR-37: An organic rust-inhibitive compound that prevents rusting while evaporating water from steel or iron following hot or cold rinsing. The compound evaporates as the water evaporates, leaving the surface ready for organic coating.

COMPOUND NR-40: A neutral degreasing and rustproofing compound for iron and steel. Imparts light, corrosive-resistant film. Cleans, temporarily rustproofs in one operation. Excellent for hot water drying of steel.

RUSTPROOFING OIL NO. 15: A polar solvent-type rustproofing oil that leaves thin film on metal. Safety solvent with flash point well over 100°F. Completely sheds water. Has a salt spray resistance of 15 to 24 hours.

RUSTPROOFING SOLUBLE OIL: An emulsifiable, rustproofing material. Corrosion-resisting oil film is created by diluting oil with water. Protects steel against rust for 10 to 15 hours in salt spray.

ENTHONE Chemical Products are formulated to meet specific metal finishing needs. Consult any one of our field representatives or write our research department regarding your finishing problems. They will gladly tell you about the ENTHONE products designed to fit into your production picture — offering operational savings, improved product performance and increased production efficiency. Write today for an obligation-free consultation.

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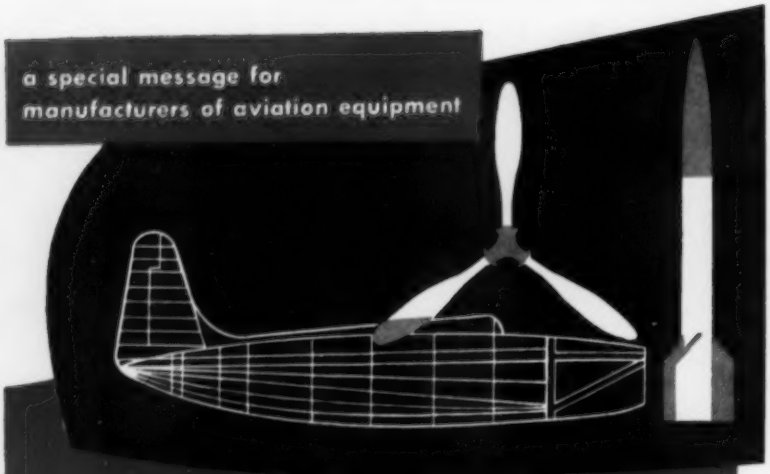
Service Representatives and Stock Points: BINGHAMTON, N. Y., Austin F. Fletcher, Inc.; CHICAGO, Ardco, Inc.; CLEVELAND, R. O. Hull & Co.; DALLAS, Weaver Engineering & Supply Co., Inc.; LOS ANGELES, L. H. Butcher Co.

a special message for manufacturers of aviation equipment



need a finish for light metal parts? specify IRIDITE

Here's the finish that combines corrosion resistance and paint adherence with extreme ease of application. It can be welded or soldered with no difficulty and presents no problem in "patching" scratches, marks or scraped sections. Here's what you can do with Iridite:

ON ZINC AND CADMIUM you can get highly corrosion resistant finishes to meet any military or civilian specifications and ranging in appearance from olive drab through sparkling bright and dyed colors.

ON COPPER . . . Iridite brightens copper, keeps it tarnish-free; also lets you drastically cut the cost of copper-chrome plating by reducing the need for buffing.

ON ALUMINUM Iridite gives you a choice of natural aluminum, a golden yellow or dye colored finishes. No special racks. No high temperatures. No long immersion. Process in bulk.

ON MAGNESIUM Iridite provides a highly protective film in deepening shades of brown. No boiling, elaborate cleaning or long immersions.

AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

WANT TO KNOW MORE? We'll gladly treat samples or send you complete data. Write direct or call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified phone book.

ALLIED RESEARCH PRODUCTS
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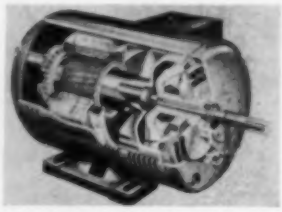
Manufacturers of Iridite Finishes for Corrosion Protection and Paint Systems on Non-Ferrous Metals, ARP Plating Chemicals
WEST COAST LICENSEE: L. H. Butcher Co.

NEW PRODUCTS and equipment

readily adjustable to many and varied applications requiring closely-controlled adjustable speeds.

Applications are varied. The



manufacturer reports of such diversified uses as drives for business machines, machine tools, conveyors, wire drawing equipment, welding machines and laboratory experimental units. Eaton Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 10

Metal Surface Cleaner

. . . simple, effective preparation

Phosteem is a product and process for providing a new method of cleaning and phosphatizing metal surfaces prior to painting operations.

It provides simple and effective method of simultaneously cleaning and phosphatizing, and is equally effective on ferrous metals, aluminum alloys, zinc-coated surfaces.

Manufacturer reports installation and operating costs are nominal and indicates the system is particularly valuable to manufacturers of complicated bulky equipment. Size, shape or complexity of the article to be cleaned or treated no longer means a costly cleaning proposition. Neilson Chemical Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 11

Rotary Table

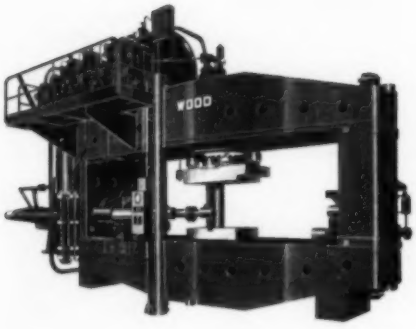
. . . air acts as bearing

A rotary table, revolved by the flick of a finger, is a completely self-contained unit without complicated pieces to assemble. It's a time saver when more than one surface of a workpiece is to be machined.

The table contains a collapsible index pin that completely eliminates all play or lost motion in the mechanism and compensates for

Would you trust the woolly bear?

Some people say that he can foretell the weather. Some say he can't. All well and good where guessing the weather's concerned. But in a business way, you have to rely on more trustworthy yardsticks than woolly bears. There *can't* be a doubt when you're investing in capital equipment. A Wood hydraulic press, for example. So—if you're not yet using Wood machines, you ask someone who is. And you find that he's satisfied with his press and the profit it makes for him. If you already *are* a Wood customer, your problem is solved. You order another Wood press. Ask for descriptive catalog.



IN METALWORKING, THE PAYOFF'S AT AN R. D. WOOD PRESS LIKE THIS ONE!

This 600/900-ton hydraulic press is designed for general upsetting work on steel tubes, bars, shafts, axles and the like. Presses of this type can be furnished in larger and smaller sizes for most upsetting operations. Write for our catalog and for engineering aid—both yours without obligation.

R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

Representatives in Principal Cities

MAKERS OF HYDRAULIC PRESSES AND VALVES

FIRE HYDRANTS

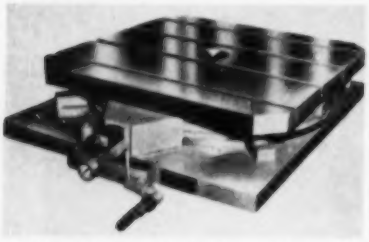
CAST-IRON PIPE

GATE VALVES

GAS PRODUCERS

ACCUMULATORS

any wear which might take place. By turning a valve at the base



of the platen, air is forced into the unit, raising the table approximately 0.001-inch. With the air acting as a bearing, the table actually floats on air and can be indexed to the desired position by simply turning the table by hand. Giddings & Lewis Machine Tool Co.

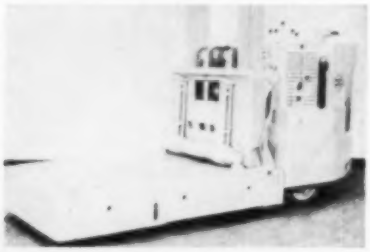
FOR MORE DATA CIRCLE REPLY CARD NO. 12

Die Puller Line

. . . achieves inching action

A new line of die pullers with capacities from 10,000 to 100,000 pounds have hydraulic lift and hydraulic push-off units that permit inching action. Hydraulic valves can be barely cracked to permit accurate positioning of platform and aligning of die in the press.

Each of the two pusher arms can be operated independently or



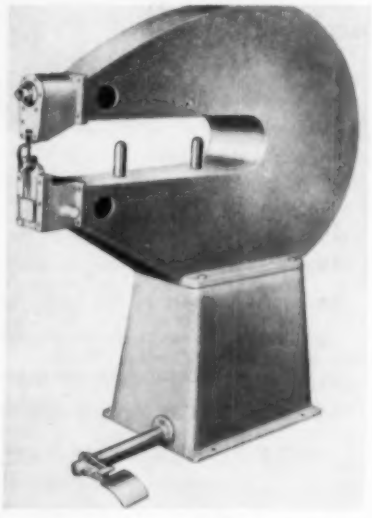
simultaneously to permit accurate maneuvering of the die into position. If necessary, a die can be pushed off diagonally even when the platform is not square with the press bed, thus saving time of maneuvering the truck. There are no lift chains, no cables between the uprights. Elwell-Parker Electric Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 13

Metal Shear

. . . adjustable stroke control

Model U-3610 Unishear has adjustable stroke control for light and heavy gage metals up to machine's capacity. Cut starts at



any point on material. The machine cuts up to 10-gage mild hot rolled steel and can work to center of a 72-inch sheet.

YOU CAN DEPEND ON

GLOBE

SUPERIOR LADLE BRICK

TO ✓ Cut down-time
✓ Lower per ton cost
✓ Increase melting capacity

SERVING THE STEEL INDUSTRY SINCE 1873 ★

The GLOBE BRICK Co.
EAST LIVERPOOL, OHIO

Machine cuts curves as small as ¼ inch, irregular shapes, angles and notches with ease. Stanley Electric Tools.

FOR MORE DATA CIRCLE REPLY CARD NO. 14

Carbide Cutting Material

. . . ups finishing speed

A new Spray-Lube system of applying cutting liquids has doubled the speed of roughing and finishing the inside surface of cast aluminum tire molds in one

application at O. K. Rubber Inc., Littleton, Colo. Norgren's system has stepped up surface cutting speed from 45 to 75 fpm; depth of cut has been increased to 0.006 inch.

Welding of chips to the cutting edge of the 14¼-inch face form tools is also eliminated with a considerable saving in need for tool repair.

Another result: Higher quality finish, because galling of workpieces has ended. C. A. Norgren Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 15

Cutting Liquid Application

. . . basic ingredient: titanium

Titanium carbide is the basic ingredient of a new compound used by Firth Sterling in a carbide cutting material that contains no tungsten and no cobalt. Nickel is used as a binder instead of cobalt, and molybdenum carbide is used as an alloy carbide addition.

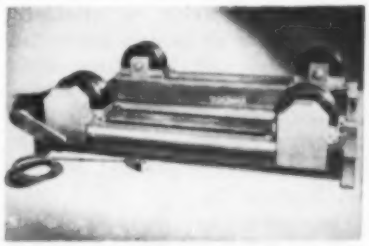
The tungsten-free grades are characterized by high wear resistance, and the cratering action of steel chips is reduced. The company reports tool life excellent on steady finishing cuts, particularly where high speeds and fine feeds are employed in machining hard abrasive steels. Firth Sterling Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 16

Turning Rolls

. . . dial-controlled

The WRD and WRI model rubber-tired turning rolls have capacities from 5000 pounds to 100,000 pounds per unit. Turning speeds from zero to 80 inches per minute in the 5000-pound class,



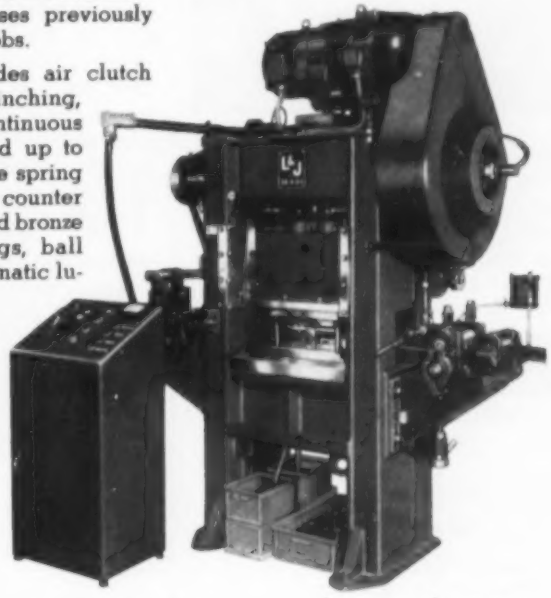
and zero to 38 inches per minute in the 100,000-pound rolls, are pro-

L&J DOUBLE CRANK PRESSES
for High Speed Production

These versatile double crank, straight side punch presses can multiply your production of small precision parts. Proven by users to be more efficient, accurate, economical of manpower . . . much superior to any presses previously used for the same jobs.

Equipment includes air clutch with controls for inching, single stroke and continuous running—any speed up to 450 SPM; air release spring set brake; two air counter balances on ram; hard bronze crankshaft bushings, ball seats and gibs; automatic lubrication; feeding device and other equipment to meet the most exacting requirements.

Write for complete information. Also 6 to 80 ton O. B. I. Presses.



Advantages

- Faster production
- Precision parts
- Large die area
- Long die life
- Adaptable for many jobs
- Low operating cost

Features

- High speed with accuracy
- Box type ram
- Adjustable square type hard bronze gibs
- Box type, rigid, welded steel frame
- Auxiliary equipment to suit the job

SPECIFICATIONS	Model 20-2-24	Model 30-2-24
Capacity	20 tons	30 tons
Strokes per minute	150-450	150-450
Stroke length, standard maximum to order	1" 2"	1" 2"
Ram adjustment (ratchet)	2"	2"
Ram area, L to R x F to B	24" x 12"	24" x 12"
Bolster area L to R x F to B	24" x 19"	24" x 19"
Die space, bed to ram (1" stroke down, adjust. up)	11"	11"
Weight, approx. pounds, as illustrated	6000	6500

L&J PRESS CORPORATION
1628 Sterling Avenue, Elkhart, Indiana

vided by a compact transmission which has a micrometer dial control.

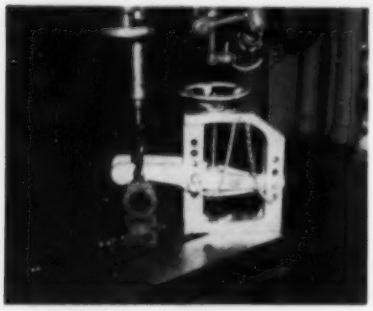
Magnetic braking is standard equipment in all models above the 10,000 class and is indispensable for seam welding. All bearings are anti-friction packed for life. Gearboxes are all-steel construction and permanently greased. Aronson Machine Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 17

Safety Clamp

. . . 8000-psi pressure

The Safety Adjustable Clamp simply clamps to a T-slot table, and is ready to go. The adjustable pins are set, work inserted,



leverage wheel turned, and work can begin. A 12-inch model is designed for heavy duty industrial production; a 6-inch model for general machine shop use.

The clamp gives 8000-psi equalized pressure with compound leverage. It works just as well on the side of the table as on the top. Safety - Adjustable - Hold - Down Clamp Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 18

Refractory Cement

. . . molten aluminum-proof

Laboratory development of a refined refractory cement claimed impervious to penetration by molten aluminum is announced. Tests indicate the cement can be used to line loop-type induction furnaces in which aluminum is melted by electricity.

The cement is said to produce a hard refractory wall impervious to aluminum chemical activity. Such activity makes aluminum one of the most difficult to handle in refractory work. Electro Refractories & Abrasives Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 19

FREE LITERATURE

Catalogs and Clip Sheets

Reply card on page 123 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Press Line

Dreis & Krump Mfg. Co.—A 4-page circular illustrates and describes Chicago SS presses. The line is made with capacity of 30 to 400 tons for blanking, drawing, die cutting, forming, notching, punching and trimming.

FOR A FREE COPY CIRCLE REPLY CARD NO. 20

Punch Catalog

Geo. F. Marchant Co.—A 48-page catalog shows the Marchant line of punches, dies, couplings, compression riveter dies, air hammer rivet sets and buffalo type punches and dies. A supplement is also supplied with each book listing the punches and dies that are carried in stock.

FOR A FREE COPY CIRCLE REPLY CARD NO. 21

Industrial Cutting Tools

Millit Inc.—A new catalog introduces several product additions to Millit's line of industrial cutting tools. The attached-blade milling cutter line has been expanded to include many additional cutter widths, not before available. The carbide slotting saw line is entirely new, as is the inserted blade milling cutter line.

FOR A FREE COPY CIRCLE REPLY CARD NO. 22

Power and Speed Control

Eaton Mfg. Co.—Eaton's line of combination power and speed control units, engineered to meet specific needs of fractional horsepower drives, is detailed in a new 8-page bulletin, FAS. Known as fractional horsepower Ajusto-Spede Drives, the units are an integral combination of ac constant speed induction motors, eddy-current couplings and electronic speed controls.

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Compete or Collapse

Westinghouse Electric Corp. — "Compete or Collapse" is a 16-page, thoroughly-illustrated brochure showing why and how electrical modernization can be a determining factor in the competition of today's economy. The report shows how modern power means increased output from men and machines, lower operating costs, less down time, better safety.

FOR A FREE COPY CIRCLE REPLY CARD NO. 24

Porcelain Enameled Aluminum

Ingram-Richardson Mfg. Co.—A specification for architectural porcelain enameled aluminum has been developed by Ingram-Richardson and is contained in a new 4-page bulletin. It covers porcelain enameled aluminum alloys, sheets, shapes and castings for architectural applications.

FOR A FREE COPY CIRCLE REPLY CARD NO. 25

High Speed Steel

Firth Sterling Inc.—A high speed steel stock list, bulletin SL-2077, lists over 800 sizes in five grades of high-speed steel. Use of the bulletin should help overcome longer delivery on mill orders.

FOR A FREE COPY CIRCLE REPLY CARD NO. 26

Facts About Zirconium

Carborundum Metals Co. Inc.—"Facts About Zirconium" is a concise compilation of information about the history and production of zirconium. Mechanical and physical properties, chemical properties, facts about fabrication are discussed in the 64-page report.

FOR A FREE COPY CIRCLE REPLY CARD NO. 27

Multiple Electrode Machine

Sciaky Bros. Inc.—Bulletin No. 313-12 covers the Sciaky SX 36 G,

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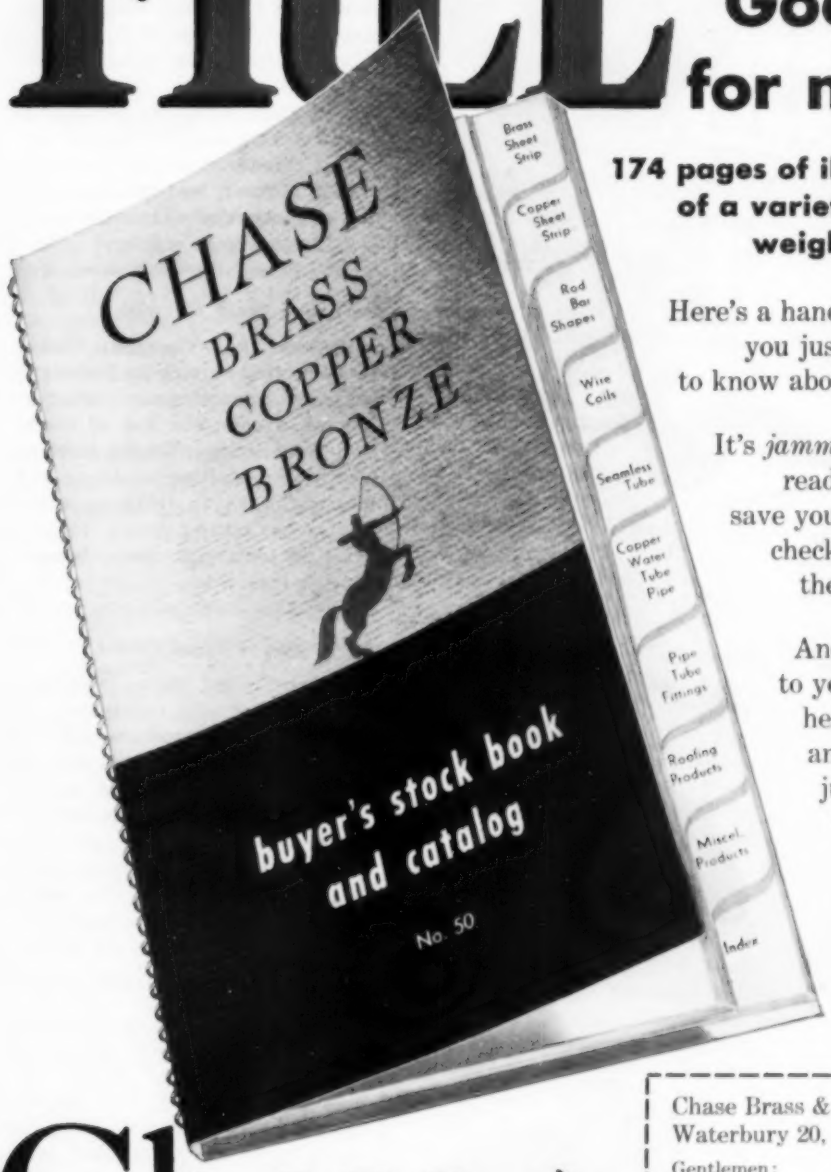

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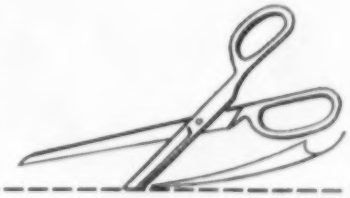

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a new standard multiple electrode machine for high production resistance welding applications. The model has universal multiple gun base with two separate platen units.

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Chaser Pipe Machine

Landis Machine Co.—A recent revision of "Receding Chaser Pipe Machines," bulletin C-77-7 gives detailed information on three sizes of Landis machines. These units are designed to produce threads to meet exacting requirements for excellent thread finish and accuracy of thread form, lead and taper required by users of oil tubular goods and high-pressure piping.

FOR A FREE COPY CIRCLE REPLY CARD NO. 29

Corrosion-Proof Material

Ceilcote Co.—"Complete Corrosion-Proofing Service for Industry" presents comprehensive information on a complete line of corrosion-proof linings, bricks, bonding cements, protective coatings and mastic floors. To facilitate selection of the correct lining, cement, brick or coating, a comprehensive chart is included.

FOR A FREE COPY CIRCLE REPLY CARD NO. 30

Air -Powered Screw Driver

Ingersoll-Rand Co. — Production men and engineers responsible for screw-assembled products will find a wealth of information in the new 20-page reference bulletin on air-powered screw drivers issued by Ingersoll-Rand. "Production Payoff" cites examples of jobs where air engineering speeds the assembly of a variety of products.

FOR A FREE COPY CIRCLE REPLY CARD NO. 31

Layout Drilling Machine

Bryant Machinery & Engineering Co.—A completely revised and expanded catalog of The Cleereman layout drilling machine has been published. The machine has many applications for that large portion of precision work which does not require tolerances closer than 0.001 inch per foot. It's especially suited for tools, dies, fixtures, molds and similar work.

FOR A FREE COPY CIRCLE REPLY CARD NO. 32

Templatooling

Template Reproduction & Engineering Co.—Templatooling is defined as a unique combination of

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exceptional services and facilities which are reducing costs and speeding products into production. Component services of Templatooling are illustrated and described in a 12-page brochure. Of particular interest is the section devoted to plastic tooling.

FOR A FREE COPY CIRCLE REPLY CARD NO. 33

New Breed of Tractors

Allis-Chalmers Mfg. Co.—Story of a complete line of ac diesel-powered crawler tractors is told pictorially in "Facts . . . on a New Breed of Tractors." The 16-page report employs the *Time* magazine "News in Pictures" format to present an application digest, operational methods and to show specific features of the four crawlers in the line.

FOR A FREE COPY CIRCLE REPLY CARD NO. 34

Steam Drop Hammers

Erie Foundry Co.—The new 20-page bulletin No. 355 does a thorough job of illustrating and describing the various sizes of Erie steam drop hammers, picturing in operation units from 2000 through 35,000-pound capacity. Standard dimensions are given for the entire hammer line, from 1000 to 70,000-pound capacity, with material specifications for components used in the hammers.

FOR A FREE COPY CIRCLE REPLY CARD NO. 35

Statistical Quality Control

Marchant Calculators Inc. — A comprehensive 52-page booklet on statistical quality control provides a technical handbook for production executives and quality control practitioners. It covers all phases of the manufacturing picture. The booklet is also a complete case history of the successful application of statistical quality control to Marchant's own extensive manufacturing operations.

FOR A FREE COPY CIRCLE REPLY CARD NO. 36

Motorized Reducers

Falk Corp.—A practical working tool for men who buy or use gear drives through 75 hp, bulletin 3100-1954 consolidates selection tables, dimensions, weights, overhung load ratings and thrust capacity ratings needed to select horizontal, vertical, or right angle Falk Motoreducers.

FOR A FREE COPY CIRCLE REPLY CARD NO. 37

RLM Specs Book

RLM Standards Institute—1954 printing of "RLM Standard Specifications for Industrial Lighting Units" carries new lighting data on units popularly called "upward component" lighting units. In addition, the book is brought up-to-date with latest approved revisions for standard specifications.

FOR A FREE COPY CIRCLE REPLY CARD NO. 38

Safety Flooring

Master Builders Co.—DPS Masterplate produces an iron-clad floor surface that is static-disseminating, spark-resistant, non-combustible and wear resistant. In addition to safety features, other advantages of the Masterplate floor include ease of cleaning, resistance to the effects of moisture and steam, non-dusting and corrosion resistance.

FOR A FREE COPY CIRCLE REPLY CARD NO. 39

Cut Gears

Jackson Gear Co. — A 12-page bulletin shows the manufacture of gears, sprockets, spline shafts, as well as ratchets, clutch hubs, grooved rolls and other such products that can be produced econom-

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ically on gear cutting machines. It explains how these products can be tailor-made to a customer's individual design and specifications. Listed is approximate range of sizes that Jackson can supply for each product.

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Maintenance Procedure

Oakite Products Inc.—How-to-do-it charts based on actual in-plant maintenance procedures are a feature of the "Plant Maintenance Cleaning Guide." Designed for quick reference, the charts list recommended cleaning materials, methods of application, concentrations and temperatures for several specific operations.

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Beryllium Copper Strip

Penn Precision Products Inc.—A new 4-page bulletin, "Introducing Penntemp Beryllium Copper Strip," presents information on a new type mill-hardened beryllium copper strip that requires no heat treatment. It describes material supplied with thickness and flatness tolerances not previously available. Discussion of temper selection and tables covering sizes and properties are included.

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Brass Nuts

Fischer Special Mfg. Co.—The advantages of Fischer nuts are listed on the first page of a 15-page brochure. Standard hexagon, closed end cap, open end cap, knurled brass thumb, lighting fixture, spark plug battery and special and odd size nuts are covered. Standards for each type described are given. Sales representatives are also listed in the catalog.

FOR A FREE COPY CIRCLE REPLY CARD NO. 43

Rotary Filing

Rota-File Corp. — Rota-Files, versatile cutting tools, applicable in almost all fields of manufacturing of metal products, plastics, wood products etc., are fully covered in an 11-page bulletin. It is pointed out that rotary or power filing in replacing outmoded methods, lowers costs and increases production on many applications. Price lists are included in the bulletin.

FOR A FREE COPY CIRCLE REPLY CARD NO. 44

Advancing Automation

Swartz Tool Products Co.—"Advancing Automation" is an 8-page brochure that describes in detail the complete services Swartz offers to builders of machine tools. It outlines their facilities for changing and building precision workholding fixtures.

FOR A FREE COPY CIRCLE REPLY CARD NO. 45

EDITORIAL REPRINTS:

Industry Goes to School

Service sells. To give service, more and more executives are running schools to show customers how to use their products. For tips on how to set up, conduct and reap the benefits of a company school, see p. 56.

FOR A FREE COPY CIRCLE REPLY CARD NO. 46

Adhesives

Adhesives have come a long way since the fish-glue days. Now, chances are there's an adhesive solution to some of your tough joining problems. Associate Editor Tom Hruby debunks the old misconceptions, while building up a case for new applications in STEEL's cover story beginning on p. 88.

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Carbides in 310 Stainless

Part 2 of Hiram Brown's article, on p. 92, concludes the series on Carbides in 310 Stainless Steel. In this part, Mr. Brown shows conditions that cause severe carbide precipitation include annealing temperatures of less than 2050° F and slow cooling from the heat treating temperature.

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Carbonitriding

Number 6 in STEEL's Modern Heat Treating Series offers economies in metal selection and processing through increased hardenability and lower transformation range. Presence of nitrogen in the austenite increases hardenability, permitting substitution of plain carbon for alloy steel or use of slower quenching medium. Story is on p. 98.

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7	17	27	37	47	57	67	77	87
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Market Outlook

CONSTRUCTION requirements provide the brightest spot in the steel markets currently. While other products are moving at noticeably slower rates than a year ago, demand for some building items is outstepping last year's pace. Structurals, sheet piling, reinforcing, guard rail and rope, and galvanized sheets are definitely pacing the market.

Bridge and highway needs stand out. Meanwhile, commercial and nonresidential public building continues to contribute surprisingly strong support to expectations of at least a near-record in construction during 1954.

DATA CONFIRM—Shipment figures show construction steel demand holding up much better than that for wire and the various flat-rolled items. Structural shipments in the first five months this year were 1 per cent above those in the like 1953 period. Another construction product, sheet piling, was up 23 per cent.

Reinforcing-bar tonnage was off 17 per cent but, significantly, this building item fared better than bar classifications going largely to manufacturing, hot-rolled being off 38 per cent and cold-finished 51. At the same time, plate shipments were down 26 per cent, hot-rolled sheets 25, cold-rolled sheets 15, electrical sheets 26, hot-rolled strip 41, cold-rolled strip 43 and drawn wire 31.

OUTLOOK PROMISING— Large structural awards being placed right along assure high-level demand for building steel through remainder of this year. Last week's awards included 19,500 tons, bridge superstructure, Burlington, N. J.; 13,000 tons, coliseum, Triboro Authority, New York; 4750 tons, towers, American Light Service Co.

Pending awards are fairly numerous. These brighten prospects for early-term volume. One currently active project, a 1450-mile pipeline, will take some 300,000 tons of pipe alone.

SUMMER SLUMP—Slackening in manufacturing this summer is greater than expected. Vacation suspensions appear more widespread and prolonged. Further, consumers are delaying building inventories. Mixed business trend also injects a confusing note.

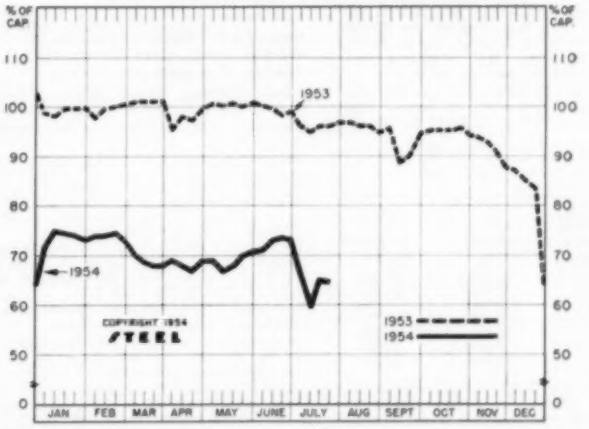
New cutbacks in farm implement and truck manufacture are reported with sales lagging behind projected production. Meanwhile, automotive requirements continue disappointing. Further decline in this market area is seen as more auto plants go into model changeover. Railroad buying drags. The same is true of shipbuilding.

PRODUCTION—The snapback in steel production from the Fourth of July curtailment, reported a week ago, lacked carry-through. The national ingot rate slipped a half point last week to 64.5 per cent.

The outlook is not too promising for much improvement before last quarter, this being reflected in reported plans to shorten the Great Lakes ore shipping season by at least a month with ore stocks at lower lake docks and furnaces now the largest in 16 years. It is thought, however, July will likely be the low month for last half in both steel demand and production.

PRICES—Last week, STEEL's arithmetical price composite rose to $115. All but a few of the smaller interests have published new lists.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended July 25	Change	Same Week 1953	Same Week 1952
Pittsburgh	61.5	— 2*	96	7
Chicago	68	— 2*	99.5	5
Mid-Atlantic	58	— 1	97.5	17
Youngstown	60	— 4*	106	6
Wheeling	83	+ 8	99	49.5
Cleveland	66.5	0*	99.5	0
Buffalo	56	— 5*	106.5	0
Birmingham	75	0	100	0.5
New England	45	— 3	48	20
Cincinnati	55.5	+ 6	91	37
St. Louis	54	— 1.5	85.5	96.5
Detroit	70	+16.5	107	49
Western	80	+ 1	104	36
National Rate	64.5	— 0.5	96	15.5

INGOT PRODUCTION‡

	Week Ended July 25	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	97.9†	95.5	107.1	132.5
NET TONS (In thousands)	1,573†	1,534	1,720	2,128

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended July 20

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.525	Bars, H.R., alloy	8.783	Strip, C.R., stainless, 430 (lb)	$0.415	Tin plate, hot-dipped, 1.25 lb	$8.433
Rails, light, 40 lb	5.917	Bars, H.R., stainless, 303 (lb)	0.418	Strip, H.R., carbon	5.088	Tin plate, electrolytic, 0.25 lb	7.133
Tie Plates	5.275	Bars, H.R., carbon	5.023	Pipe, black, buttweld (100 ft)	15.000	Black plate, can making quality	6.233
Axles, railway	7.500	Bars, reinforcing	5.058	Pipe, galv., buttweld (100 ft)	18.310	Wire, drawn, carbon	7.938
Wheels, freight car, 33 in. (per wheel)	48.500	Bars, C.F., carbon	8.174	Pipe line (100 ft)	146.804	Wire, drawn, stainless, 430 (lb)	0.545
Plates, carbon	4.675	Bars, C.F., alloy	11.285	Casing, oil well, carbon (100 ft)	154.216	Bale ties (bundle)	5.860
Structural Shapes	4.517	Bars, C.F., stainless, 302 (lb)	0.433	Casing, oil well, alloy (100 ft)	220.223	Nails, wire, 8d common	7.815
Bars, tool steel, carbon (lb)	0.430	Sheets, H.R., carbon	4.880	Tubes, boiler (100 ft)	‡	Wire, barbed (80-rod spool)	7.109
Bars, tool steel, alloy, oil hardening die (lb)	0.525	Sheets, C.R., carbon	5.871	Tubing, mechanical, carbon	‡	Woven wire fence (20-rod roll)	16.815
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.115	Sheets, galvanized	7.140	Tubing, mechanical, stainless, 304 (100 ft)	161.193	‡ Not available.	
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.610	Sheets, C.R., stainless, 302 (lb)	0.548				
		Sheets, electrical	9.350				
		Strip, C.R., carbon	7.507				

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	July 20 1954	July 13 1954	Month Ago	July Average
(1947-1949=100)	144.5	144.5	140.9	144.5

STEEL's FINISHED STEEL PRICE INDEX*

	July 21 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	194.25†	194.15†	189.75	189.18	152.90
Index in cents per lb.	5.262†	5.260†	5.140	5.125	4.142

STEEL's ARITHMETICAL PRICE COMPOSITES

	July 21 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel, NT*	$115.00†	$114.91†	$113.20	$114.84	$91.82
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.07
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.60
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	27.33	27.67	27.83	43.42	19.17

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.
†Preliminary

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	July 21 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.15	4.15	3.35
Bars, H.R., Chicago	4.30	4.30	4.15	4.15	3.35
Bars, H.R., del. Philadelphia	4.55	4.55	4.405	5.302	3.816
Bars, C.F., Pittsburgh	5.40	5.40	5.20	5.20	3.95
Shapes, Std., Pittsburgh	4.25	4.25	4.10	4.10	3.25
Shapes, Std., Chicago	4.25	4.25	4.10	4.10	3.25
Shapes, del., Philadelphia	4.53	4.53	4.38	4.38	3.492
Plates, Pittsburgh	4.225	4.225	4.10	4.10	3.40
Plates, Chicago	4.225	4.225	4.10	4.10	3.40
Plates, Coatesville, Pa.	4.225	4.225	4.10	4.35	3.50
Plates, Sparrows Point, Md.	4.225	4.225	4.10	4.10	3.40
Plates, Claymont, Del.	4.225	4.225	4.10	4.55	3.50
Sheets, H.R., Pittsburgh	4.05	4.05	3.925	3.925	3.25
Sheets, H.R., Chicago	4.05	4.05	3.925	3.925	3.25
Sheets, C.R., Pittsburgh	4.95	4.95	4.775	4.775	4.00
Sheets, C.R., Chicago	4.95	4.95	4.775	4.775	4.00
Sheets, C.R., Detroit	5.10	5.10	4.975	4.975	4.20
Sheets, Galv., Pittsburgh	5.45	5.45	5.275	5.275	4.40
Strip, H.R., Pitts.	4.425	4.425	4.425	3.975-4.425	3.25
Strip, H.R., Chicago	4.05	4.05	3.925	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.45	5.45-5.95	4.375
Strip, C.R., Chicago	6.00	6.00	5.70	5.70	4.00
Strip, C.R., Detroit	5.60-5.90	5.60-5.90	5.65	5.45-6.05	4.20
Wire, Basic, Pitts.	5.75	5.75	5.525	5.475-5.525	4.15
Nails, Wire, Pittsburgh	6.85	6.85	6.55	6.35-6.55	5.15
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$7.75
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$78.00	$78.00	$75.50	$70.50	$61.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	4.675	4.675	4.525	4.525	3.40

PIG IRON, Gross Ton	July 21 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	60.75	49.39
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.25
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, del. Phila.	60.16	60.16	60.16	61.25	49.89
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	60.43	45.43
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	200.00†	200.00†	200.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$28.50	$28.50	$29.50	$44.50	$21.00
No. 1 Heavy Melt, E. Pa.	24.50	24.00	23.00	43.50	17.00
No. 1 Heavy Melt, Chicago	29.00	30.50	31.00	41.50	19.50
No. 1 Heavy Melt, Valley	26.50	26.50	28.50	45.50	18.50
No. 1 Heavy Melt, Cleve.	24.50	24.50	27.50	44.50	15.00
No. 1 Heavy Melt, Buffalo	26.50	25.50	26.50	40.75	19.25
Rails, Rerolling, Chicago	42.50	42.50	44.50	54.00	27.75
No. 1 Cast, Chicago	36.00	36.00	38.50	41.00	29.50

COKE, Net Ton

Beehive, Furn, Connlsvl.	$14.75	$14.75	$14.75	$14.75	$13.25
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	17.00	15.75
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.00

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 21.50, pigs 20.00 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 23.30; No. 13, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 27.50-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb del.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 del. Conn. Valley, 30.125 del. Midwest; Lake 30.00 del; Fire refined 29.75 del.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 13.80, chemical 13.90, corroding 13.90, St. Louis; N.Y. basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks, 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New York, $285-$290, nom., per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots for addition to cast iron, 60.00; prices

DAILY NONFERROUS PRICE RECORD

	Price July 21	Last Change	Previous Price	June Avg.	May Avg.	July 1953 Avg.
Copper	30.00	Apr. 12	29.75-30.00	30.000	30.000	29.846
Lead	13.80	June 15	14.05	13.906	13.800	13.483
Zinc	11.00	June 3	10.50	10.923	10.290	11.000
Tin	96.00	July 21	96.75	94.178	93.600	81.577
Nickel	60.00	Jan. 14, 1953	56.50	60.000	60.000	60.000
Aluminum	21.50	July 15, 1953	20.50	21.500	21.500	20.923
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99 + %, del.; Magnesium 99.8%, Freeport, Tex.

f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium. $140-$150 per troy oz nom.

Palladium: $21 per troy oz.

Platinum: $84-$87 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $5-$6 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 96.75.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.) $4.72; grade A-2 (0.5% Fe max) $4.46 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $4.95 per lb, f.o.b. shipping point; less than 1000 lb $5.10; 99+% hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.00, brass special 11.25, intermediate 11.50, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.35, special high grade 12.50, die casting alloy ingot 15.00, del.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50. (Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingots: Piston Alloy 20.00-20.50; No. 12 foundry alloy (No. 2 grade) 19.25-19.75; 5% silicon alloy, 0.60 Cu max., 22.25-22.50; 13 alloy, 0.60 Cu max., 22.25-22.50; 195 alloy 21.00-21.50; 108 alloy 19.75-20.25; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 20.50-21.00; grade 2, 19.50-20.00; grade 3, 18.50-19.00; grade 4, 17.50-18.00.

Brass Ingot: Red brass, No. 115, 27.00; tin bronze No. 225, 39.00; No. 245, 33.25; high-leaded tin bronze, No. 305, 31.50; No. 1 yellow, No. 405, 23.25; manganese bronze No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 27.00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l. 37.03. Magnet wire del., 15,000 lb or more 41.83; l.c.l. 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $19.00 per cwt; pipe, full coils $19.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets $6; hot-rolled and forged bars, $6.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C. R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	86.5	67.5	92.5
Strip, C.R.	92.5	70.5	98.5
Plate, H.R.	84.5	66.5	90.5
Rod, Shapes	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks	..	60.0	...

ALUMINUM

(30,000 lb base; freight allowed over 499 lb) Sheets and Circles: 28 and 38 mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-48	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* 72-180 in. lengths. †26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. width or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
28-F, 38-F	32.4	36.3
50S-F	33.5	37.4
48-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

*24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 11S-T3	Round 17S-T4	Hexagonal 11S-T3	Hexagonal 17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 43.8-34.4, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares, Class 1, 50.2-38.4 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
⅜	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 66.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ⅛ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.083-in., 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 28 clippings 15.25-15.75; low copper clippings 13.00; mixed clippings 11.00; old sheet 10.00; borings and turnings 6.00; pistons and struts 7.50; crankcases 10.00; industrial castings 10.00.

Copper and Brass: Heavy copper and wire, No. 1 24.50-25.00; No. 2 copper 23.00-23.50; light copper 21.00-21.50; No. 1 composition red brass 19.00-19.50; No. 1 composition turnings 18.50-19.00; mixed brass turnings 11.50-12.00; new brass clippings 18.00; No. 1 brass rod turnings 15.00; light brass 11.50-12.00; heavy yellow brass 14.00; new brass rod ends 16.00; auto radiators, unsweated 15.00; cocks and faucets 16.00-16.50; brass pipe 16.50-17.00.

Lead: Heavy 11.00-11.25; battery plate 5.75-6.00; linotype and stereotype 13.00; electrotype 11.50; mixed babbitt 12.00-12.50.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 23.00-25.00; old sheet 21.00-23.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 50.00.

Zinc: Old zinc, 4.75-5.00; new die cast scrap, 4.50-4.75; old die cast scrap, 3.00-3.25.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 28, 38 clippings 15.25-15.75; 518, 528 clippings 15.00-15.50; 148, 178, 248 clippings 14.25-14.50; mixed clippings 14.00-14.50; old sheet 13.00-13.50; old cast 13.00-13.50; clean old cable, free of steel 15.00-15.50; borings and turnings 13.25-13.75.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper Brass: No. 1 copper 27.00-27.25; No. 2 copper 25.50-25.75; light copper 24.00-24.25; refinery brass (60% copper) per dry copper content 22.75-23.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 27.00-27.25; No. 2 copper 25.50-25.75; light copper 24.00-24.25; No. 1 composition borings 20.50; No. 1 composition solids 21.50; heavy yellow brass solids 16.50; yellow brass turnings 16.00; radiators 17.50-17.75.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.145; 200-499 lb $1.13; 500-999 lb $1.125; 1000 lb or more $1.12.

Zinc: Bar 18.50, bar or flat top 17.50 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 72.5; 100-699 lb 58.1; 700-1900 lb 55.7; 2000-9900 lb 53.9; 10,000 lb or more 52.8.

Stannous Chloride: (Anhydrous): Less than 50 lb $1.588; 50 lb $1.248; 100-300 lb $1.098; 400-900 lb $1.074; 100-1900 lb $1.049; 2000-4900 lb $1.013; 50000-19,000 lb 95.2; 20,000 lb and over 89.1.

Stannous Sulphate: Less than 5 lb $1.287; 50 lb 98.7; 100-1900 lb 96.7; 2000 lb and over 94.7.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	34.50d	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.275
Naval Brass	45.76	40.07	52.82	48.92	18.250	18.000	17.500
Commercial Bronze, 90%	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	53.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5%	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Nonferrous Metals

Aluminum industry faces eighth price hike since 1949 next month when wage negotiations are settled. Competitive metals won't make their move until the light metal does

ALUMINUM PRODUCERS soon will be confronted with the same unpleasant decision on prices that faced steelmakers.

Precedent and market opinion indicate pig and ingot aluminum will go up ½ to 1 cent after wage settlements are reached in the industry. The increase won't mean much in the cost of such products as the typical automobile which uses only about 20 pounds of aluminum, but will show up more dramatically in other transportation equipment (the Talgo train uses 2 tons of aluminum per unit), aircraft (which use 1/6 of total aluminum production), construction (the Tishman building required 175 tons) and electrical products.

Seventh Round—The record shows aluminum workers have won wage increases in each postwar year except 1949 and 1951. There have been seven price increases in the same period. First (of 1 cent) came in May, 1948, before which pig sold for 14 cents and ingot for 15 cents. Subsequent boosts came in October, 1948 (1 cent); May, 1950 (½ cent); September, 1950 (1.5 cents); August, 1952 (1 cent); January, 1953 (½ cent), and July 1, 1953 (½ cent on pig, 1 cent on ingot).

Comparisons with steel can be misleading as aluminum isn't as closely tied to direct labor charges. While direct wages in steel amount to 17-20 per cent of the value of the product, direct labor cost for aluminum is estimated to represent about 10-12 per cent of ingot cost. Conversion costs for aluminum are higher, ranging from about 25 per cent higher for commercial sheets to over 100 per cent for alloy sheets.

Sales, Profits Off—One argument advanced in favor of a price increase is that a sizable portion of new aluminum capacity was built under five-year amortization and should be paid for out of current earnings. Once it pays off this high capital investment, the aluminum industry will have a great deal of flexibility in making short-term price reductions.

Profits of the big three aluminum producers were off in the first half in comparison with last year in spite of record primary production. Chief reason is that much metal went to the national stockpile in ingot form. Naturally the companies would rather build their civilian market than ask the government to buy the metal under market guarantees.

Alternatives—The two alternatives of the aluminum producers' dilemma: To increase volume at a smaller percentage of profit, or to lower volume at a higher percentage of profit. A more serious question to the fast-growing industry than losing customers is losing prospects. How many borderline possibilities will put off using aluminum because of a price increase?

Reynolds Metals Co.

ALUMINUM SQUEEZE

. . . will higher wages boost prices?

Suppliers of competing materials will await the outcome with great interest. Makers of flat-rolled stainless aren't setting their prices until aluminum men take action. Copper companies can probably absorb a wage raise similar to steel without increasing prices. Chore for aluminum men, who will be facing the problem next month, is to pass on as much of the increase as possible without sacrificing competitive position.

Metals in a Nutshell

Sizing up the outlook for metals in its newly released booklet *Commodities*, New York's 75-year-old Bache & Co. sees these trends:

Copper—"Alone of the major nonferrous metals, copper has maintained its price close to postwar highs. This is largely due to the sales policy of primary producers, who have been unwilling to make sales at fixed prices or for forward delivery, and to Chile's withholding of her production from the market for many months. . . .Chile's production is once more available and, therefore, world supplies of copper will now be in excess of any normal peacetime consumption. At copper's present high level aluminum continuously edges copper out of its traditional fields of application, and already copper's future role in industry has been diminished. Stockpiling is unlikely to do more than lock up existing stocks. From the long view copper, therefore, at these levels looks unhealthy."

Tin—"The international tin agreement should help to stabilize tin prices between 85 cents and $1.10 per pound. The continued operation of the Longhorn smelter by the U. S. government is an outcome of the dangerous political conditions prevailing in the Asiatic tin producing areas. The Longhorn smelter will require to be fed both with low-grade Bolivian concentrates and sweeteners of alluvial concentrates from the Belgian Congo and Indonesia. This should absorb any additional supplies of tin over normal world industrial requirements. The outlook for tin is good."

Zinc—"For many months zinc stocks have inexorably increased. This is the outcome of heavy foreign imports, reduced steel output and large increase in marginal mine production. Zinc prices have suffered accordingly, and the historic superiority of the zinc price to lead has been reversed. Mine production and smelter capacity have been steadily reduced. Today supply and demand are more or less in balance. GSA's stockpile buying should help reduce current stocks. Therefore, the coming months should see improvement in this metal."

Lead—"The use of lead in storage batteries, cable, ammunition, tetraethyl lead, all major uses, is affected by competitive materials only to a limited extent. The other uses of lead are more vulnerable. White lead and red lead, the use of lead in building construction and caulking lead, all face serious competition, usually on a cost basis. The statistical position of lead has remained tight and prices have held beyond most people's expectations. There is no doubt that the increasing 'destruction' of lead in tetraethyl compounds is playing a part in lead's postwar strength. Announcement of further buying for the stockpile is likely to lift the lead price to higher levels."

IMPROVEMENTS AT *Newport Steel* BENEFIT YOU

PRODUCTS OF NEWPORT STEEL

Hot-Rolled Steel in Coil

Hot-Rolled Pickled Steel in Coil

Electric Weld Line Pipe

Hot-Rolled Sheets

Galvanized Sheets

Galvannealed Sheets

Colorbond Sheets

Hot-Rolled Pickled Sheets

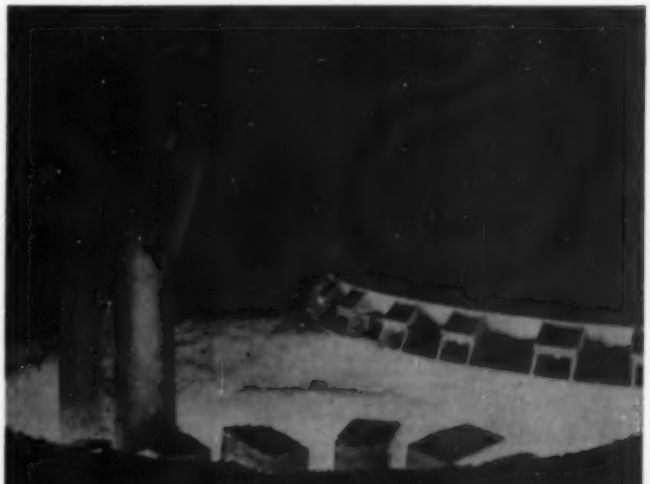
Electrical Sheets

Alloy Sheets and Plates

Roofing and Siding

Eave Trough and Conductor Pipe

Culverts



The quality of Newport products has been enhanced greatly by a continuing program of expansion and improvement. Newport combines the priceless ingredients of modern facilities and personnel of long experience, to provide higher quality at competitive prices. More flexible operation ensures more prompt shipment to customers in good times and bad, from this central location in America's fastest growing industrial area. Note the list of grades now available; discuss your requirements with Newport and explore the advantages of making this your source for quality steel products.

ECONOMICAL WATERRAIL DELIVERY

Newport Steel is situated on the Mississippi-Ohio River system and the great Cincinnati rail hub. With the advantage of location, new river barge facilities and seven major railroads, Newport gives economical, dependable delivery to industrial areas throughout the Middle West and South.

Newport Steel

CORPORATION

NEWPORT, KENTUCKY

STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on page 131. Key to footnotes, page 133.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ..... $61.50
INGOTS, Alloy (NT)
Detroit R7 ..... $63.00
Midland,Pa. C18 ..... 62.00
Munhall,Pa. U5 ..... 65.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Aliquippa,Pa. J5 ....$64.00
Bessemer,Pa. U5 ..... 64.00
Clairton,Pa. U5 ..... 64.00
Ensley,Ala. T2 ..... 64.00
Fairfield,Ala. T2 ..... 64.00
Fontana,Calif. K1 ....72.00
Gary,Ind. U5 ..... 64.00
Johnstown,Pa. B2 ....64.00
Lackawanna,N.Y. B2 ..64.00
Munhall,Pa. U5 ..... 64.00
So.Chicago,Ill. U5 ....64.00
So.Duquesne,Pa. U5 ..64.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 .....$78.00
Bessemer,Pa. U5 ..... 78.00
Buffalo R2 ..... 78.00
Clairton,Pa. U5 ..... 78.00
Cleveland R2 ..... 78.00
Conshohocken,Pa. A3 ..83.00
Detroit R7 ..... 78.50
Ensley,Ala. T2 ..... 78.00
Fairfield,Ala. T2 ..... 78.00
Fontana,Calif. K1 ....86.00
Gary,Ind. U5 ..... 78.00
Geneva,Utah C11 ..... 78.00
Houston S5 ..... 85.50
Johnstown,Pa. B2 ..... 78.00
Lackawanna,N.Y. B2 ..78.00
LosAngeles B3 ..... 87.00
Munhall,Pa. U5 ..... 78.00
Seattle B3 ..... 91.50
So.Chicago R2,U5,W14..78.00
So.Duquesne,Pa. U5 ...78.00
So.SanFrancisco B3 ...87.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$86.00
Buffalo R2 ..... 86.00
Canton,O. T7 ..... 82.00
Canton,O. R2 ..... 86.00
Conshohocken,Pa. A3 ..93.00
Detroit R7 ..... 84.00
Fontana,Calif. K1 ....105.00
Gary,Ind. U5 ..... 86.00
Houston S5 ..... 93.00
Ind.Harbor,Ind. Y1 ....86.00
Johnstown,Pa. B2 ..... 86.00
Lackawanna,N.Y. B2 ..86.00
LosAngeles B3 ..... 106.00
Massillon,O. R2 ..... 86.00
Midland,Pa. C18 ..... 82.00
Munhall,Pa. U5 ..... 86.00
So.Chicago R2,U5,W14..86.00
So.Duquesne,Pa. U5 ...86.00
Struthers,O. Y1 ..... 86.00
Warren,O. C17 ..... 86.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$96.50
Cleveland R2 ..... 96.50
Gary,Ind. U5 ..... 96.50
So.Chicago R2, W14 ..96.50
So.Duquesne,Pa. U5 ...96.50

SKELP
Aliquippa,Pa. J5 .....4.00
Fontana,Calif. K1 ....4.775
Munhall,Pa. U5 .....3.90
Warren,O. R2 .....3.90
Youngstown R2, U5 ....3.90

WIRE RODS
AlabamaCity,Ala. R2 ..4.675
Aliquippa,Pa. J5 .....4.675
Alton,Ill. L1 ..... 4.85
Buffalo B11, W12 ....4.675
Cleveland A7 ..... 4.675
Donora,Pa. A7 ..... 4.675
Fairfield,Ala. T2 ....4.675
Fontana,Calif. K1 ....5.475
Houston S5 ..... 5.075
IndianaHarbor,Ind. Y1 4.675
Johnstown,Pa. B2 ....4.675
Joliet,Ill. A7 ..... 4.675
KansasCity,Mo. S5 ..... 5.015
Kokomo,Ind. C16 ..... 4.775
LosAngeles B3 ..... 5.475
Minnequa,Colo. C10 ..... 4.925
Monessen,Pa. P7 ..... 4.675
No.Tonawanda,N.Y.B11 4.525
Pittsburg,Calif. C11 ..5.325
Portsmouth P12 ..... 4.675
Roebling,N.J. R5 ..... 4.775
So.Chicago,Ill. R2 ....4.675
Sterling,Ill.(1) N15 ....4.675
Struthers,O. Y1 .....4.675
SparrowsPoint,Md. B2..4.775
Torrance,Calif. C11 ..5.475
Worcester,Mass. A7 ..4.975

STRUCTURALS

Carbon Steel Stand. Shapes
Aliquippa,Pa. J5 .....4.25
Bessemer,Ala. T2 .....4.25
Bethlehem,Pa. B2 .....4.30
Birmingham C15 .....4.25
Clairton,Pa. U5 .....4.25
Fairfield,Ala. T2 .....4.25
Fontana,Calif. K1 .....4.90
Gadsden,Ala.(31) R2 ..4.28
Gary,Ind. U5 .....4.25
Geneva,Utah C11 .....4.25
Houston S5 ..... 4.65
Ind.Harbor,Ind. I-2 ....4.25
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ..... 4.85
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 ..... 4.95
Minnequa,Colo. C10 ..... 4.70
Munhall,Pa. U5 .....4.25
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 ....3.80
Seattle B3 ..... 5.00
So.Chicago U5, W14....4.25
So.SanFrancisco B3 ....4.90
Torrance,Calif. C11 ....4.95
Weirton,W.Va. W6 ....4.25

Wide Flange
Bethlehem,Pa. B2 ....4.30
Clairton,Pa. U5 .....4.25
Fontana,Calif. K1 ....5.25
Lackawanna,N.Y. B2 ..4.30
Munhall,Pa. U5 .....4.25
Phoenixville,Pa. P4 ....3.80
So.Chicago,Ill. U5 .....4.25

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.20
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.20
Munhall,Pa. U5 .....5.20
So.Chicago,Ill. U5 ....5.20

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....6.40
Bessemer,Ala. T2 .....6.40
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.40
Fairfield,Ala. T2 .....6.40
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....6.40
Geneva,Utah C11 .....6.40
Ind.Harbor,Ind. I-2, Y1.6.40
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 ..... 7.10
Munhall,Pa. U5 .....6.40
Seattle B3 ..... 7.15
So.Chicago,Ill. U5, W14.6.40
So.SanFrancisco B3 ....7.05
Struthers,O. Y1 .....6.40

H.S., L. A. Wide Flange
Bethlehem,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
Munhall,Pa. U5 .....6.40
So.Chicago,Ill. U5 ....6.40

PILING

Bearing Piles
Munhall,Pa. U5 .....4.25
So.Chicago,Ill. U5 .....4.25

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ..5.075
Lackawanna,N.Y. B2..5.075
Munhall,Pa. U5 .....5.075
So.Chicago,Ill. U5 ....5.075

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2..4.255
Aliquippa,Pa. J5 .....4.225
Ashland,Ky.(15) A10 ..4.225
Bessemer,Ala. T2 .....4.225
Buffalo(31) R2 .....4.13
Clairton,Pa. U5 .....4.225
Claymont,Del. C22 ....4.225
Chicago(31) R2 .....4.17
Cleveland J5 .....4.225
Cleveland(31) R2 .....4.285
Coatesville,Pa. L7 ....4.225
Conshohocken,Pa. A3 ..4.225
Ecorse,Mich. G5 .....4.375
Fairfield,Ala. T2 .....4.225
Fontana,Calif.(30) K1..4.875
Gadsden,Ala.(31) R2 ..4.13
Gary,Ind. U5 .....4.225
Geneva,Utah C11 .....4.225
GraniteCity,Ill. G4 ....4.425
Harrisburg,Pa. C8 .....3.85
Houston S5 ..... 4.625
Ind.Harbor,Ind. I-2, Y1 4.225
Johnstown,Pa. B2 .....4.225
Lackawanna,N.Y. B2..4.225
LoneStar,Tex. L6 .....4.40
Mansfield,O. E6 .....4.225
Minnequa,Colo. C10 ..... 5.075
Munhall,Pa. U5 .....4.225
Newport,Ky. N9 .....4.225
Pittsburgh J5 .....4.225
Riverdale,Ill. A1 .....4.225
Seattle B3 .....5.125
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. U5,W14.4.225
SparrowsPoint,Md. B2 .4.225
Steubenville,O. W10 ....4.225
Warren,O.(31) R2 ....4.625
Weirton,W.Va. W6 ....4.225
Youngstown(31) R2 ....4.275
Youngstown U5, Y1 ..4.225

PLATES, Carbon Abras. Resist.
Fontana,Calif. K1 ....6.025
Geneva,Utah C11 ....5.375

PLATES, Wrought Iron
Economy,Pa. B14 .....9.80

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland J5, R2 .....6.45
Conshohocken,Pa. A3 ..6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana,Calif.(30) K1..7.15
Gary,Ind. U5 .....6.45
Geneva,Utah C11 .....6.45
Ind.Harbor,Ind. I-2, Y1.6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 ..... 7.35
Munhall,Pa. U5 .....6.45
Pittsburgh J5 .....6.45
Seattle B3 .....7.15
Sharon,Pa. S3 .....6.45
So.Chicago,Ill. U5, W14..6.45
SparrowsPoint,Md. B2 ..6.45
Warren,O. R2 .....6.45
Youngstown U5, Y1 ....6.45

PLATES, Alloy
Claymont,Del. C22 ....5.80
Coatesville,Pa. L7 ....5.80
Fontana,Calif. K1 ....6.85
Gary,Ind. U5 .....5.80
Johnstown,Pa. B2 .....5.80
LosAngeles B3 ..... 6.70
Munhall,Pa. U5 .....5.80
Newport,Ky. N9 .....5.80
Sharon,Pa. S3 .....5.80
So.Chicago,Ill. U5, W14..5.80
SparrowsPoint,Md. B2 ..5.80

FLOOR PLATES
Cleveland J5 .....5.275
Conshohocken,Pa. A3..5.275
Harrisburg,Pa. C5 ....5.15
Ind.Harbor,Ind. I-2 ..5.275
Munhall,Pa. U5 .....5.275
So.Chicago,Ill. U5 ....5.275

PLATES, Ingot Iron
Ashland c.l. (15) A10..4.475
Ashland l.c.l. (15) A10.4.975
Cleveland c.l. R2 .....4.70
Warren,O. c.l. R2 ....4.70

BARS

BARS, Hot-Rolled Carbon
Aliquippa,Pa. J5 .....4.30
Alton,Ill. L1 ..... 4.50
Atlanta,Ga. A11 .....4.50
Bessemer,Ala. T2 .....4.30
Birmingham C15 .....4.30
Buffalo(31) R2 .....4.33
Canton,O.(31) R2 .....4.46
Chicago(31) R2 .....4.37
Clairton,Pa. U5 .....4.30
Cleveland(31) R2 .....4.36
Detroit R7 .....4.30
Ecorse,Mich. G5 .....4.45
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif. K1 .....5.00
Gary,Ind. U5 .....4.30
Gadsden,Ala.(31) R2 ..4.33
Houston S5 ..... 4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ..... 4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 ..... 5.00
Massillon,O.(31) R2 ....4.46
Milton,Pa. M18 .....4.15
Minnequa,Colo. C10 ..... 4.75
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11.4.30
Pittsburg,Calif. C11 ....5.00
Portland,Oreg. O4 .....5.05
Seattle B3, N14, P23 ....5.05
So.Chicago U5, W14 ....4.30
So.Duquesne,Pa. U5 ....4.30
So.SanFran.,Calif. B3 ..5.05
Sterling,Ill.(1) N15 .....4.30
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 .....5.00
Warren,O. R2 .....4.34
Weirton,W.Va. W6 .....4.30
Youngstown U5 .....4.30
Youngstown(31) R2 ....4.35

Bars, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....5.075
Buffalo R2 .....5.105
Canton,O. T7 .....4.875
Canton,O. R2 .....5.115
Chicago R2 .....5.145
Clairton,Pa. U5 .....5.075
Detroit R7 .....4.975
Ecorse,Mich. G5 .....5.225
Fontana,Calif. K1 ....6.125
Fairless,Pa. U5 .....5.225
Gary,Ind. U5 .....5.075
Houston S5 ..... 5.475
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 .....5.075
KansasCity,Mo. S5 ..... 5.675
Lackawanna,N.Y. B2..5.075
LosAngeles B3 ..... 6.125
Massillon,O. R2 .....5.115
Midland,Pa. C18 .....4.875
So.Chicago U5, W14 ..5.075
So.Duquesne,Pa. U5 ...5.075
Struthers,O. Y1 .....5.075
Warren,O. C17 .....5.075
Warren R2 .....4.34
Youngstown U5 .....5.075
Youngstown R2 .....4.35

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.46
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland R2 .....6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.45
Ind.Harb.,Ind. I-2, Y1.6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 ..... 7.15
Pittsburgh J5 .....6.45
Seattle B3 ..... 7.20
So.Chicago W14 .....6.45
So.Duquesne,Pa. U5 ...6.45
So.SanFrancisco B3 ....7.20
Struthers,O. Y1 .....6.45
Youngstown U5 .....6.45

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 .....4.45

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.30
Atlanta A11 .....4.50
Fontana,Calif. K1 ....5.00
Niles,Calif. P1 .....4.85
SanFrancisco S7 ..... 4.70

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.20
Gary,Ind. U5 .....5.20
Houston S5 .....5.60
KansasCity S5 ..... 5.80
Youngstown U5 .....5.20

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ....5.40
BeaverFalls,Pa. R2 ....5.46
Buffalo B5 .....5.45
Camden,N.J. P13 .....5.85
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7, C20 ....5.40
Detroit P17, R7 .....5.35
Detroit B5 .....5.60
Donora,Pa. A7 .....5.40
Elyria,O. W8 .....5.20
FranklinPark,Ill. N5 ...5.40
Gary,Ind. R2 .....5.47
GreenBay,Wis. F7 .....5.40
Hammond,Ind. L2, M13.5.40
Hartford,Conn. R2 ....5.90
Harvey,Ill. B5 .....5.40
LosAngeles R2 .....6.85
LosAngeles S30 .....6.65
Mansfield,Mass. B5 ...5.95
Massillon,O. R8 ..... 5.40
Massillon,O. R2 .....5.44
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.85
NewCastle,Pa.(17) B4 ..5.40
Pittsburgh J5 .....5.40
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 ....5.95
Readville,Mass. C14 ....5.95
St.Louis,Mo. M5 ..... 5.70
So.Chicago,Ill. W14 ....5.40
SpringCity,Pa. K3 .....5.85
Struthers,O. Y1 .....5.40
Waukegan,Ill. A7 .....5.40
Worcester,Mass. W19 ...6.10
Youngstown F3, Y1 ....5.40

BARS, Cold-Finished Alloy
(Turned and Ground)
Cumberland,Md.(5) C19 4.45

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.625
BeaverFalls,Pa. M12 ...6.625
BeaverFalls,Pa. R2 ...6.685
Bethlehem,Pa. B2 ..... 6.625
Buffalo B5 .....6.625
Camden,N.J. P13 .....6.80
Canton,O. T7 .....6.325
Carnegie,Pa. C12 .....6.625
Chicago W18 .....6.325
Cleveland A7, C20 ....6.625
Detroit R7 .....6.425
Detroit P17 .....6.475
Detroit B5 .....6.825
Donora,Pa. A7 .....6.325
Elyria,O. W8 .....6.325
Gary,Ind. R2 .....6.695
Hammond,Ind. L2, M13 6.625
Hartford,Conn. R2 ....6.925
Harvey,Ill. B5 .....6.625
Lackawanna,N.Y. B2..6.325
Mansfield,Mass. B5 ..7.075
Massillon,O. R8 ..... 6.625
Massillon,O. R2 .....6.665
Midland,Pa. C18 .....6.325
Monaca,Pa. S17 .....6.625
Newark,N.J. W18 .....6.80
Plymouth,Mich. P5 ....6.525
So.Chicago,Ill. R2 ....6.325
So.Chicago W14 .....6.625
SpringCity,Pa. K3 ....6.80
Struthers,O. Y1 .....6.625
Warren,O. C17 .....6.625
Waukegan,Ill. A7 .....6.325
Worcester,Mass. A7 ...6.925
Youngstown F3, Y1 ....6.625

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..4.33
Atlanta A11 .....4.50
Birmingham C15 .....4.30
Buffalo(31) R2 .....4.33
Chicago(31) R2 .....4.37
Cleveland(31) R2 .....4.36
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif. K1 ....5.00
Gadsden,Ala.(31) R2 ..4.18
Gary,Ind. U5 .....4.30
Houston S5 ..... 4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ..... 4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 ..... 5.00
Milton,Pa. M18 .....4.15
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ....5.00
Pittsburgh J5 .....4.30
SandSprings,Okla. S5 ..... 5.15
Seattle B3, N14, P23....5.05
So.Duquesne,Pa. U5 ....4.30
So.SanFrancisco B3 ....5.05
SparrowsPoint,Md. B2 ..4.30
Sterling,Ill.(1) N15 ....4.30
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Youngstown U5 .....4.30
Youngstown(31) R2 ....4.35

BARS, Reinforcing
(Fabricated; to consumers)
Johnstown, ¼-1" B2 ..5.55
KansasCity S5 .....6.35
LosAngeles B3 ..... 5.95
Marion,O. P11 .....5.55
Seattle N14 .....5.80
Seattle P23 .....5.85
Seattle B3 ..... 6.15
So.SanFrancisco B3 ....6.00
SparrowsPt. ¼-1" B2 ..5.55
Williamsport,Pa. S19 ..5.60

RAIL STEEL BARS
Avis,Pa.(3) J5 .....4.25
ChicagoHts.(3) C2, I-2.4.20
ChicagoHts.(4) C2, I-2.4.30
Ft. Worth,Tex.(26) T4..4.65
Franklin,Pa.(3) F5 ....4.05
Franklin,Pa.(4) F5 ....4.15
Marion,O(3) P11 .....4.15
Moline,Ill.(3) R2 ..... 4.30
Tonawanda(3,4) B12 ....4.15
Williamsport,Pa.(3) S19.4.30

BARS, Wrought Iron
Economy,Pa.(S.R.) B14 10.85
Economy,Pa.(D.R.) B14 13.50
Economy(Staybolt) B14 13.80
McK.Rks.(S.R.) L5 ...10.85
McK.Rks.(D.R.) L5 ...14.75
McK.Rks.(Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ..4.05
Allenport,Pa. P7 ..... 4.05
Ashland,Ky.(8) A10 ....4.05
Cleveland J5, R2 .....4.05
Conshohocken,Pa. A3 ..4.10
Detroit M1 .....4.075
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.05
Fairless,Pa. U5 .....4.10
Fontana,Calif. K1 ....4.825
Gary,Ind. U5 .....4.05
Geneva,Utah C11 .....4.15
GraniteCity,Ill. G4 ....4.25
Ind.Harbor,Ind. I-2, Y1 4.05
Irvin,Pa. U5 .....4.05

Kokomo,Ind. C16 ..... *4.15*
Lackawanna,N.Y. B2 ..4.05
Mansfield,O. E6 (37) ..4.05
Mansfield,O. E6 (38) ..4.80
Munhall,Pa. U5 .....4.05
Newport,Ky N9 .....4.05
Niles,O. N12 .....4.05
Pittsburg,Calif. C11 ....4.75
Pittsburgh J5 .....4.05
Portsmouth,O. P12 ..... *4.05*
Riverdale,Ill. A1 .....4.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ...4.05
SparrowsPoint,Md. B2..4.05
Steubenville,O. W10 ..... *4.05*
Warren,O. R2 .....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5, Y1 ....4.05

SHEETS, H.R. (19 ga. lighter)
AlabamaCity,Ala. R2 ..5.35
Kokomo,Ind. C16 ..... *5.20*
Niles,O. N12 .....4.95

SHEETS, H.R. (14 ga. heavier)
High-Strength Low-Alloy
Cleveland J5, R2 .....6.10
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.25
Fairfield,Ala. T2 .....6.10
Fairless,Pa. U5 .....6.15
Fontana,Calif. K1 ....6.875
Gary,Ind. U5 .....6.10
Ind.Harbor,Ind. I-2, Y1 6.10
Irvin,Pa. U5 .....6.10
Lackawanna(35) B2 ....6.10
Munhall,Pa. U5 .....6.10
Pittsburgh J5 .....6.10
Sharon,Pa. S3 .....6.10
So.Chicago,Ill. U5 ....6.10
SparrowsPoint(36) B2 ..6.10
Warren,O. R2 .....6.10
Weirton,W.Va. W6 ....6.10
Youngstown U5, Y1 ....6.10

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)
Ashland,Ky.(8) A10 ..4.30
Cleveland R2 .....4.65
Cleveland J5 .....4.775
Ind.Harbor,Ind. I-2 ...4.30
Warren,O. R2 .....4.65

SHEETS, Cold-Rolled Steel
(Commercial Quality)
Allenport,Pa. P7 ..... *4.95*
Cleveland J5, R2 .....4.95
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....4.95
Fairless,Pa. U5 .....5.00
Follansbee,W.Va. F4 ..4.95
Fontana,Calif. K1 ....6.05
Gary,Ind. U5 .....4.95
GraniteCity,Ill. G4 ....5.15
Ind.Harbor,Ind. I-2, Y1 4.95
Irvin,Pa. U5 .....4.95
Lackawanna,N.Y. B2 ..4.95
Middletown,O. A10 ....4.95
Pittsburg,Calif. C11 ...5.90
Pittsburgh J5 .....4.95
Portsmouth,O. P12 ..... *4.95*
SparrowsPoint,Md. B2..4.95
Steubenville,O. W10 ..... *4.95*
Warren,O. R2 .....4.95
Weirton,W.Va. W6 ....4.95
Youngstown Y1 .....4.95

SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 .....7.50
Ecorse,Mich. G5 .....7.65
Fairless,Pa. U5 .....7.55
Fontana,Calif. K1 ....8.55
Gary,Ind. U5 .....7.50
IndianaHarbor,Ind. Y1..7.50
Irvin,Pa. U5 .....7.50
Lackawanna(37) B2 ..7.50
Pittsburgh J5 .....7.50
SparrowsPoint(38) B2 ..7.50
Warren,O. R2 .....7.50
Weirton,W.Va. W6 ....7.50
Youngstown Y1 .....7.50

SHEETS, Cold-Rolled Ingot Iron
Cleveland R2 .....5.55
Middletown,O. A10 ....5.45
Warren,O. R2 .....5.55

SHEETS, Culvert	**Cu Alloy**	**Cu Fe**
Ashland,Ky. A10	6.50	....
Canton,O. R2	6.50	7.10
Fairfield T2	6.25	6.50
Gary,Ind. U5	6.25	6.50
Ind.Harbor I-2	6.25	6.50
Irvin,Pa. U5	6.075	6.325
Kokomo,Ind. C16	*6.35*	....
MartinsFry.,O.W10	*6.25*	....
Newport,Ky. N9	6.25	6.50
Pitts.,Calif. C11	7.00	....
SparrowsPt. B2	6.25	....

SHEETS, Culvert	**Pure Iron**
Ashland,Ky. A10	6.75
Fairfield,Ala. T2	6.50
MartinsFerry,O. W10	*6.50*

SHEETS, Galvanized Steel
Hot-dipped
AlabamaCity,Ala. R2 ..5.45‡
Ashland,Ky. A10 .....5.45*
Butler,Pa. A10 .....5.45†
Canton,O. R2 .....5.45‡
Dover,O. R1 .....5.45‡
Fairfield,Ala. T2 .....5.45*
Gary,Ind. U5 .....5.45*
GraniteCity,Ill. G4 ....5.45†
Ind.Harbor,Ind. I-2 ...5.45†
Irvin,Pa. U5 .....5.45†
Kokomo,Ind. C16 ..... *5.55†*
MartinsFerry,O. W10 ..... *5.45*
Middletown,O. A10 ....5.45†
Newport,Ky. N9 .....5.45†
Niles,O. N12 .....5.45‡
Pittsburg,Calif. C11 ..6.20*
SparrowsPt.,Md. B2 ..5.45‡
Steubenville,O. W10 ...5.275‡
Weirton,W.Va. W6 ...5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous

SHEETS, Galvanized
High-Strength Low-Alloy
Irvin,Pa. U5 .....8.20
SparrowsPoint(39) B2 ..8.20

SHEETS, Galvanized Ingot Iron
Ashland,Ky.(8) A10 ...5.70
Canton,O. R2 .....6.20

SHEETS, Galvannealed Steel
Canton,O. R2 .....5.85
Irvin,Pa. U5 .....6.00
Kokomo,Ind. C16 ..... *5.95†*
Newport,Ky. N9 .....6.00
Niles,O. N12 .....6.00

SHEETS, Galvanized
Ingot Iron
(Hot-dipped continuous)
Ashland,Ky. A10 .....5.70
Butler,Pa. A10 .....5.70
Middletown,O. A10 ....5.70

SHEETS, Electrogalvanized
Cleveland R2 (28) 6.15
Niles,O. R2 (28) 6.15
Weirton,W.Va. W6 ...5.975

SHEETS, Aluminum Coated
Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron
Ashland,Ky.(8) A10 ..5.375
Cleveland R2 .....5.375
Gary,Ind. U5 .....8.375
GraniteCity,Ill. G4 ....5.575
Ind.Harbor,Ind. I-2 ...5.375
Irvin,Pa. U5 .....5.375
Middletown,O. A10 ....5.375
Niles,O. N12 .....5.375
Youngstown Y1 .....5.375

BLUED STOCK, 29 ga.
Follansbee,W.Va. F4 ..7.375
Follansbee(23) F4 ....6.60
Yorkville,O. W10 ..... *7.375*

SHEETS, Long Terne Steel
(Commercial Quality)
BeechBottom,W.Va. W10 ..... *5.85*
Gary,Ind. U5 .....5.85
Mansfield,O. E6 .....5.85
Middletown,O. A10 ....5.85
Niles,O. N12 .....5.85
Weirton,W.Va. W6 ....5.85

SHEETS, Long Terne, Ingot Iron
Middletown,O. A10 ...6.25

SHEETS, Well Casing
Fontana,Calif. K1 ....6.325

STRIP

STRIP, Hot-Rolled Carbon
Ala.City,Ala.(27) R2 ..4.05
Allenport,Pa. P7 ..... *4.05*
Alton,Ill. L1 ..... *4.225*
Ashland,Ky.(8) A10 ....4.05
Atlanta A11 .....4.25
Bessemer,Ala. T2 .....4.05
Birmingham C15 .....4.05
Bridgeport,Conn.(10)S15 4.05
Buffalo(27) R2 .....4.05
Carnegie,Pa. S18 .....4.425
Conshohocken,Pa. A3..4.175
Detroit M1 .....4.075
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.05
Fontana,Calif. K1 ....4.825
Gary,Ind. U5 .....4.05
Houston,Tex. S5 ..... *4.45*
Ind.Harbor,Ind. I-2, Y1 4.05
Johnstown,Pa.(25) B2...4.05
KansasCity,Mo.(9) S5 ..... *4.65*
Lackw'na,N.Y.(25) B2..4.05
LosAngeles(25) B3 ..... *4.80*
Milton,Pa. M18 .....3.925
Minnequa,Colo. C10 ..... *5.15*
NewBritain(10) S15 ....4.05
N.Tonawanda,N.Y. H11 4.05
Pittsburg,Calif. C11 ....4.80
Portsmouth,O. P12 ..... *4.05*
Riverdale,Ill. A1 .....4.05
SanFrancisco S7 ..... *5.00*
Seattle(25) B3, P23 ....5.05
Seattle N14 .....5.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
So.SanFrancisco(25) B3 4.80
SparrowsPoint,Md. B2...4.05
Sterling(1) N15 ..... *4.05*
Torrance,Calif. C11 ....4.80
Warren,O. R2 .....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5 .....4.05

STRIP, Hot-Rolled Alloy
Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.40
Fontana,Calif. K1 ....8.10
Gary,Ind. U5 .....6.70
Houston,Tex. S5 ..... *7.10*
KansasCity,Mo. S5 ..... *7.30*
LosAngeles B3 ..... *7.90*
NewBritn.,Conn.(10)S15 6.45
Newport,Ky. N9 .....6.70
Seattle P23 .....7.80
Sharon,Pa. S3 .....6.70
So.Chicago W14 .....6.70
Youngstown U5 .....6.70

STRIP, Hot-Rolled
High-Strength Low-Alloy
Bessemer,Ala. T2 .....6.15
Conshohocken,Pa. A3 ..5.95
Ecorse,Mich. G5 .....6.30
Fairfield,Ala. T2 .....6.15
Fontana,Calif. K1 .....7.25
Gary,Ind. U5 .....6.15
Ind.Harbor,Ind. I-2 Y1 6.15
Lackawanna,N.Y. B2 ..6.15
LosAngeles(25) B3 ..... *6.90*
Seattle(25) B3, P23 ..... *7.15*
Sharon,Pa. S3 .....6.15
So.SanFrancisco(25) B3 *6.90*
SparrowsPoint,Md. B2 ..6.15
Warren,O. R2 .....6.15
Weirton,W.Va. W6 ....6.15
Youngstown U5, Y1 ....6.15

STRIP, Hot-Rolled Ingot Iron
Ashland,Ky.(8) A10 ...4.30
Warren,O. R2 .....4.65

STRIP, Cold-Rolled Carbon
Anderson,Ind. G5 .....5.75
Baltimore T6 .....5.60
Bridgeport,Conn.(10)S15 5.75
Cleveland J5 .....5.75
Cleveland A7 .....5.75
Dearborn,Mich. D3 ....5.90
Detroit M1 .....5.60
Detroit D2 ..... *5.90*
Detroit P20 .....5.65
Dover,O. G6 .....5.75
Ecorse,Mich. G5 .....5.90
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 ....7.85
FranklinPark,Ind. T6 ..... *5.85*
Ind.Harbor,Ind. I-2 ...6.00
Indianapolis C8 ..... *5.90*
Lackawanna,N.Y. B2 ...5.75
LosAngeles C1 .....7.50
Mattapan,Mass. T6 ..... *6.30*
Middletown,O. A10 ....5.75
NewBedford,Mass. R10 ..... *6.20*
NewBritain(10) S15 ...5.75
NewCastle,Pa. B4, E5 ..5.75
NewHaven,Conn. A7 ...6.50
NewHaven,Conn. D2 ..... *6.20*
Pawtucket,R.I. N8 ....6.10
Pawtucket,R.I. R3 ....6.40
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ..... *5.75*
Riverdale,Ill. A1 .....5.85
Rome,N.Y.(32) R6 ..... *5.75*
Sharon,Pa. S3 .....5.75
SparrowsPt.,Md. B2, T6 5.75
Trenton,N.J. R5 .....7.00
Wall'ford,Conn. W2 ...6.20
Warren,O. B9 .....5.45
Warren,O. R2, T5 ..... *5.75*
Warren,O. R4 ..... *5.90*
Weirton,W.Va. W6 ....5.75
Worcester,Mass. A7 ....6.60
Youngstown Y1 .....5.75
Youngstown C8 ..... *5.75*

STRIP, Cold-Rolled Alloy Steel
Carnegie,Pa. S18 .....12.00
Cleveland A7 .....12.45
Dover,O. G6 .....12.45
Fontana,Calif. K1 ....14.55
FranklinPark,Ill. T6 ..... *12.40*
Harrison,N.J. C18 ....12.00
Mattapan,Mass. T6 ..... *12.80*
Pawtucket,R.I.(11) N8.12.15
Pawtucket,R.I.(12) N8.12.45
Sharon,Pa. S3 ..... *12.45*
Worcester,Mass. A7 ...12.75
Youngstown C8 ..... *12.90*

STRIP, Cold-Rolled
High-Strength Low-Alloy
Cleveland A7, J5 .....8.60
Dearborn,Mich. D3 ....8.35
Dover,O. G6 .....8.60
Ecorse,Mich. G5 .....8.75
Lackawanna,N.Y. B2..8.425
Pittsburgh J5 .....8.60
Sharon,Pa. S3 ..... *8.60*
SparrowsPoint,Md. B2.8.425
Warren,O. R2 ..... *8.60*
Weirton,W.Va. W6 ...8.60
Youngstown Y1 .....8.60

STRIP, Cold-Rolled Ingot Iron
Warren,O. R2 .....6.35

TIGHT COOPERAGE HOOP
Atlanta A11 .....4.775
Riverdale,Ill. A1 .....4.625
Sharon,Pa. S3 .....4.475
Youngstown U5 .....4.475

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.
B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Div., H. K. Porter Co. Inc.
B14 A. M. Byers Co.
B15 J. Bishop & Co.
C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.
D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.
E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.
G2 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
H7 Helical Tube Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.
J1 Jackson Iron& Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel&Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott
N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel
Y1 Youngstown Sheet & Tube

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.60	7.95	8.90	10.45	13.15
Bridgeport,Conn.(10) S15	5.75	8.05	9.00	10.95	13.25
Bristol,Conn. W1	...	...	*9.30*	*11.45*	...
Carnegie,Pa. S18	...	*8.05*	*9.00*	*11.15*	*13.25*
Cleveland A7	5.75	8.05	9.00	11.15	13.25
Cleveland,O. C7	...	8.00	8.90	10.85	12.86
Dearborn,Mich. D3	5.90	8.25	9.26	...	...
Detroit D2	*5.90*	*8.25*	*9.20*	*10.95*	...
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	*5.85*	*8.05*	*9.00*	*11.15*	*13.85*
Harrison,N.J. C18	...	...	...	...	14.15
Indianapolis C8	...	*8.20*	*9.00*	*10.85*	...
Mattapan,Mass. T6	*6.30*	*8.35*	*9.30*	*11.45*	*14.15*
Newbrits.,Conn.(10) S15	*5.75*	*8.05*	*9.00*	*11.15*	*13.85*
NewCastle,Pa. B4	5.75	8.05	9.00	10.95	...
NewCastle,Pa. E5	5.75	8.05	9.00	10.95	13.25
NewHaven,Conn. D2	*6.20*	*8.35*	*9.30*	*11.25*	...
NewYork W3	...	7.95	8.90	10.45	13.15
Pawtucket,R.I.(11) N8	...	7.65	8.60	10.55	12.85
Pawtucket,R.I.(12) N8	6.10	7.95	8.90	10.85	13.15
Riverdale,Ill.(1) A1	*5.85*	*8.05*	*9.00*	*11.15*	*13.85*
Sharon,Pa. S3	*5.75*	*8.05*	*9.00*	*11.15*	*13.85*
SparrowsPt.,Md. T6	*5.75*	*8.35*	*9.30*	*11.45*	*14.15*
Trenton,N.J. R5	...	*8.35*	*9.30*	*11.45*	*14.15*
Wallingford,Conn. W2	6.20	8.35	9.30	11.25	13.55
Warren,O. T5	*5.75*	*8.05*	*9.00*	*10.95*	*13.25*
Weirton,W.Va. W6	5.85	8.05	9.00	10.95	13.25
Worcester,Mass. A7	6.60	8.35	9.30	11.45	14.15
Worcester,Mass. T6	*6.30*	*8.35*	*9.30*	*11.45*	*14.15*
Youngstown C8	...	...	*8.05*	*10.95*	*13.25*
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	*12.90*	*15.60*	...
Buffalo W12	...	...	*12.90*	...	...
FranklinPark,Ill. T6	...	...	13.25	15.75	18.75
Harrison,N.J. C18	...	...	12.50	15.00	18.00
NewYork W3	...	...	12.50	15.00	18.00
Trenton,N.J. R5	...	...	*12.90*	*15.60*	*19.00*
Worcester,Mass. T6	...	...	*12.90*	*15.60*	*19.00*
Worcester,Mass. W12	...	...	*12.90*	...	...
Youngstown C8	...	...	12.85	15.35	18.35

SILICON STEEL

H.R. SHEETS (22 gage) (Cut Lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	*9.10*	*10.10*	*11.00*
Brackenridge,Pa. A4	...	...	*9.10*	*10.10*	*11.00*
IndianaHarbor,Ind. I-2	8.025	8.50	9.10	10.10	....
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	....
Vandergrift,Pa. U5	...	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	....
Zanesville,O. A10	...	8.50	9.10	10.10	11.00

C.R. CUT LENGTHS OR COILS (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	*9.85*	*10.85*	*11.75*
GraniteCity,Ill. G4	8.425*	8.95*	9.55*	10.55*	....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift,Pa. U5	...	9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.225*	8.75*	9.35*	10.35*	11.25*
Warren,O. R2	8.225	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Gage) (Cut Lengths)	Transformer Grade T-73	T-65	T-58	T-52
BeechBottom,W.Va. W10	*11.95*	*12.50*	*13.00*	*14.00*
Brackenridge,Pa. A4	*11.95*	...	...	...
Newport,Ky. N9	11.95	....	....	....
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95	12.50	13.00	14.00

C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-72
Butler,Pa. A10	....	....	16.60	17.10	....
Vandergrift,Pa. U5	14.00	15.00	16.60	17.00	12.70
Warren,O. R2	...	...	...	...	12.70†

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	7.65	8.05
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	lb	lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	8.95
Weirton,W.Va. W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.10

MANUFACTURING TERNES (Special Coated)	
Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb Coated, 6 lb	
Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. (8 lb Coated)	
Yorkville,O. W10	$8.65

ROOFING SHORT TERNES	
Gary,Ind. U5	9.75

WIRE

WIRE, Manufacturers Bright, Low Carbon	
Alabama City,Ala. R2	5.75
Aliquippa,Pa. J5	5.75
Alton,Ill. L1	*5.925*
Atlanta A11	5.95
Bartonville,Ill. K4	*5.85*
Buffalo W12	*5.75*
Chicago W18	5.75
Cleveland A7, C20	5.75
Crawfordsville,Ind M8	5.625
Donora,Pa. A7	5.75
Duluth,Minn. A7	5.75
Fairfield,Ala. T2	5.75
Fostoria,O.(24) S1	5.75
Houston S5	*6.15*
Jacksonville,Fla. M8	6.05
Joliet,Ill. A7	5.75
KansasCity,Mo. S5	*6.35*
Kokomo,Ind. C16	*5.85*
LosAngeles B3	*6.70*
Minnequa,Colo. C10	*6.00*
Monessen,Pa. P7	*5.75*
No.Tonawanda B11	5.75
Palmer,Mass. W12	*6.05*
Pittsburg,Calif. C11	6.70
Portsmouth,O. P12	*5.75*
Rankin,Pa. A7	5.75
So.Chicago,Ill. R2	5.75
So.SanFrancisco C10	*6.70*
SparrowsPoint,Md. B2	5.85
Sterling,Ill.(1) N15	5.75
Struthers,O. Y1	5.75
Waukegan,Ill. A7	5.75
Worcester,Mass. A7	6.05

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	*7.375*
Bartonville,Ill. K4	*7.30*
Buffalo W12	*7.20*
Cleveland A7	7.20
Donora,Pa. A7	7.20
Duluth,Minn. A7	7.20
Fostoria,O. S1	6.925
Johnstown,Pa. B2	7.20
LosAngeles B3	*8.15*
Millbury,Mass.(12) N6	7.225
Minnequa,Colo. C10	*7.45*
Monessen,Pa. P7	*7.20*
Monessen,Pa. P16	7.20
Muncie,Ind. I-7	*7.40*
Palmer,Mass. W12	*7.50*
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	*7.20*
Roebling,N.J. R5	*7.50*
So.Chicago,Ill. R2	7.20
So.SanFran. C10	8.15
SparrowsPt.,Md. B2	7.30
Struthers,O. Y1	7.20
Trenton,N.J. A7	7.50
Waukegan,Ill. A7	7.20
Worcester J4	7.225
Worcester T6, W12	*7.50*
Worcester A7	7.50

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	6.90
Alton,Ill. L1	*7.075*
Buffalo W12	*6.90*
Cleveland A7	6.90
Donora,Pa. A7	6.90
Duluth,Minn. A7	6.90
Johnstown,Pa. B2	6.90
LosAngeles B3	*7.85*
Minnequa,Colo. C10	*7.075*
Monessen,Pa. P7	*6.90*
Monessen,Pa. P16	6.90
NewHaven,Conn. A7	7.20
Palmer,Mass. W12	*7.20*
Pittsburg,Calif. C11	7.85
Portsmouth,O. P12	*6.90*
Roebling,N.J. R5	*7.20*
So.Chicago,Ill. R2	6.90
So.SanFrancisco C10	7.85
SparrowsPoint,Md. B2	7.00
Trenton,N.J. A7	7.20
Waukegan,Ill. A7	6.90
Worcester,Mass. A7	7.20

WIRE, Fine & Weaving(8" Coils)	
Alton,Ill. L1	*11.375*
Bartonville,Ill. K4	*11.30*
Buffalo W12	*11.20*
Chicago W13	10.55
Cleveland A7	11.20
Crawfordsville,Ind. M8	10.65
Fostoria,O. S1	10.55
Jacksonville,Fla. M8	11.08
Johnstown,Pa. B2	10.55
Kokomo,Ind. C16	10.55
Minnequa,Colo. C10	*10.95*
Monessen,Pa. P16	11.20
Muncie,Ind. I-7	*11.40*
Palmer,Mass. W12	*11.50*
Roebling,N.J. R5	*11.50*
So.SanFrancisco C10	11.55
Waukegan,Ill. A7	11.20
Worcester,Mass. A7	11.50
Worcester,Mass. T6	*11.50*

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K4	*9.90*
Buffalo W12	*9.90*
Johnstown,Pa. B2	*9.90*
Minnequa,Colo. C10	*10.025*
Monessen,Pa. P16	9.90
Muncie,Ind. I-7	*10.10*
Portsmouth,O. D2	9.50
Roebling,N.J. R5	*10.20*
SparrowsPt.,Md. B2	*10.00*

ROPE WIRE	(A)
Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.35
Monessen,Pa. P7	9.35
Monessen,Pa. P16	9.75
Muncie,Ind. I-7	*9.95*
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
SparrowsPt. B2	9.45
Struthers,O. Y1	9.75
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead	
Alton,Ill. L1	12.75
Bartonville,Ill. K4	*13.25*
Monessen,Pa. P16	13.15
Roebling,N.J. R5	*13.45*

WIRE, Cold-Rolled Flat	
Anderson,Ind. G6	7.95
Baltimore T6	7.75
Buffalo W12	*7.95*
Cleveland A7	7.95
Crawfordsville,Ind. M8	7.55
Dover,O. G6	7.95
Fostoria,O. S1	7.45
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	*8.05*
Massillon,O. R8	*7.45*
Monessen,Pa. P7	*7.95*
Monessen,Pa. P16	7.95
Pawtkt.,R.I.(12) N8	7.75
SparrowsPt.,Md. T6	*8.25*
Trenton,N.J. R5	*8.25*
Worcester A7, T6, W12	*8.25*

WIRE, Merchant Quality (6 to 8 gage)	An'ld.	Galv.
Ala.City R2	6.90	7.30**
Aliquippa J5	6.90	7.425*
Atlanta A11	7.00	7.55
Bartonville(48)K4	*7.00*	*7.55*
Buffalo W12	*6.90*	*7.30†*
Cleveland A7	6.90	....
Crawfordsville M8	6.775	7.30
Donora,Pa. A7	6.90	7.30†
Duluth,Minn. A7	6.90	7.30†
Fairfield T2	6.90	7.30†
Houston,Tex. S5	*7.30*	*7.70*
Jacksonville,Fla. M8	7.20	7.73
JohnstownB2(48)	6.90	7.45*
Joliet,Ill. A7	6.90	7.30†
KansasCity,Mo.S5	*7.50*	*7.90*
Kokomo C16	*7.00*	*7.40†*
LosAngeles B3	*7.85*	
Minnequa C10	*7.15*	*7.55***
Monessen P7 (48)	*6.90*	*7.45*
Palmer W12	*7.20*	*7.60†*
Pitts.,Calif. C11	7.85	8.25†
Portsmouth(48)P12	*6.90*	
Rankin A7	6.90	7.30†
So.Chi'go R2	6.90	7.30**
S.S.Frn.(48)C10	7.85	8.25**
Spar'wsPt.B2(48)	7.00	7.55*
Stri'g(1)(48)N15	6.90	7.45
Struthers,O. Y1	6.90	7.40‡
Worcester A7	7.20	....

* Based on 10c zinc; † 5c zinc; ‡ Less than 10c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½Ga.	Col.
Ala.City,Ala. R2	140**
Ala.City, 17 ga. R2	*241**
Ala.City, 18 ga. R2	*257**
Aliq'ppa,Pa.9-14½ga.J5	149*
Atlanta A11	151
Bartonville,Ill. K4	*151*
Crawfordsville,Ind. M8	145
Donora,Pa. A7	146†
Duluth,Minn. A7	146†
Fairfield,Ala. T2	146†
Houston,Tex. S5	*154*
Johnstown,Pa. B2	149
Johnstown 17 ga., 6" B2	234
Johnstown 4" B2	237
Joliet,Ill. A7	146†
KansasCity,Mo. S5	*158*
Kokomo,Ind. C16	*148†*
Minnequa,Colo. C10	*154**
Monessen,Pa. 9 ga. P17	*151*
Pittsburg,Calif. C11	169†
Rankin,Pa. A7	146†
So.Chicago,Ill. R2	146**
Sterling,Ill.(1) N15	149

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	155
Atlanta A11	157
Bartonville,Ill. K4	*157*
Crawfordsville,Ind. M8	151
Donora,Pa. A7	155
Duluth,Minn. A7	155
Fairfield,Ala. T2	155
Joliet,Ill. A7	155
KansasCity,Mo. S5	*167*
Kokomo,Ind. C16	*157*
Minnequa,Colo. C10	*160*
Pittsburg,Calif. C11	179
So.Chicago,Ill. R2	155
So.SanFran.,Calif. C10	179
SparrowsPoint,Md. B2	157
Sterling,Ill.(1) N15	155

WIRE, Barbed	Col.
AlabamaCity R2	159**
Aliquippa J5	156*
Atlanta A11	164
Bartonville,Ill. K4	*164*
Crawfordsville,Ind. M8	158
Donora,Pa. A7	159†
Duluth,Minn. A7	159†
Fairfield,Ala. T2	159†
Houston,Tex. S5	*167*
Johnstown,Pa. B2	162*
Joliet,Ill. A7	159†
KansasCity,Mo. S5	*171*
Kokomo,Ind. C16	*161†*
Minnequa,Colo. C10	*165***
Monessen,Pa. P7	*163*
Pittsburg,Calif. C11	179†
Rankin,Pa. A7	159†
So.Chicago,Ill. R2	159**
S.SanFrancisco C10	179**
SparrowsPoint,Md. B2	164*
Sterling,Ill.(1) N15	162

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

WIRE (16 gage)	An'ld. Stone	Galv. Stone
Ala.City R2	12.50	14.05**
Aliquippa J5	12.50	14.30*
Bartonville K4	*13.25*	*15.40*
Buffalo W12	*13.15*	....
Cleveland A7	13.15	....
CrawfordsvilleM8	12.50	14.30
Fostoria,O. S1	12.60	14.15
Johnstown B2	12.50	14.35*
Kokomo C16	12.60	14.15†
Minnequa C10	*13.40*	*15.10***
Palmer,Mass.W12	*13.15*	*14.70**
Pitts.,Calif. C11	13.50	15.05†
SparrowsPt. B2	12.60	14.45*
Sterling(1) N15	13.15	15.00
Waukegan A7	13.15	14.70†
Worcester A7	13.45	....

* Based on 11c zinc; † 5c zinc; ** Subject to zinc equalization extras.

NAILS, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	137
Atlanta A11	139
Bartonville,Ill. K4	*139*
Chicago,Ill. W13	137
Cleveland A9	142
Crawfordsville,Ind. M8	133
Donora,Pa. A7	137
Duluth,Minn. A7	137
Fairfield,Ala. T2	137
Galveston,Tex. D7	139
Houston,Tex. S5	*145*
Johnstown,Pa. B2	137
Joliet,Ill. A7	137
KansasCity,Mo. S5	*149*
Kokomo,Ind. C16	*139*
Minnequa,Colo. C10	*142*
Monessen,Pa. P7	*137*
Pittsburg,Calif. C11	158
Rankin,Pa. A7	137
So.Chicago,Ill. R2	137
SparrowsPt.,Md. B2	139
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	143

NAILS, CUT (100 lb keg) To dealers (33)	
Conshohocken,Pa. A3	$8.30
Wheeling,W.Va. W10	*8.30*

STAPLES, Polished Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	138
Aliquippa,Pa. J5	138
Atlanta A11	140
Bartonville,Ill. K4	*140*
Crawfordsville,Ind. M8	135
Donora,Pa. A7	138
Duluth,Minn. A7	138
Fairfield,Ala. T2	138
Johnstown,Pa. B2	138
Joliet,Ill. A7	138
Kokomo,Ind. C16	*140*
Minnequa,Colo. C10	*143*
Monessen,Pa. P7	*138*
Pittsburg,Calif. C11	157
Rankin,Pa. A7	138
So.Chicago,Ill. R2	138
SparrowsPt.,Md. B2	140
Sterling,Ill.(1) N15	138
Worcester,Mass. A7	144

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, 1-2	*150*
Duluth,Minn. A7	150
Franklin,Pa. F5	*150*
Johnstown,Pa. B2	145
Marion,O. P11	145
Minnequa,Colo. C10	*155*
Moline,Ill. R2	150
So.Chicago,Ill. R2	145
Tonawanda,N.Y. B12	145
Williamsport,Pa. S19	150

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.66		5.82		7.62		9.20		10.89		14.61		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	13.5	list	17.5	0.25	20	2.75	21.5	4.25	21.5	4.25	20.75	3.5	23.25	6
Ambridge, Pa. N2 (†)	13.5	...	17.5	...	20.0	...	21.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3 (*)	13.5	2.25	17.5	3.25	20	5.75	21.5	7.25	21.5	7.25	20.75	6.5	23.25	9
Youngstown Y1 (††)	13.5	+1.5	17.5	0.75	20	3.25	21.5	4.75	21.5	4.75	20.75	4	23.25	6.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2 (**)	13.5	1.5	17.5	0.75	20.0	3.25	21.5	4.75	21.5	4.75	20.75	4.0	23.25	6.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		¾		1		1¼		1½	
List Per Ft	5.5c		8c		8c		8.5c		11.5c		17c		33c		27.5c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	...	...	....	...	....	....	23.75	7.5	26.75	11.5	29.25	15	31.75	16	32.25	17
Alton, Ill. L1 (§)							*21.75*	*6.5*	*24.75*	*10.5*	*27.25*	*14*	*29.75*	*14.75*	*30.25*	*15.75*
Benwood, W.Va. W10(††)	24	+2.5	15.25	+8.25	7.25	+14.25	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75	32.25	17.75
Butler, Pa. F6††	25	+1.5	17	+6.5	9.5	+12	....	..	....	..	....	...	....	....	....	....
Etna, Pa. N2 (†)	...	...	....	...	....	....	23.75	8.5	26.75	12.5	24.25	16	31.75	16.75	32.25	17.75
Fairless, Pa. N3	...	...	....	...	....	....	19.25	..	22.25	..	24.75	...	27.25	....	27.75	....
Fontana, Calif. K1 (§)	...	...	....	...	....	....	*10.75*	*+6.5*	*13.75*	*+0.5*	*16.25*	*3*	*18.75*	*3.75*	*19.25*	*4.75*
Ind. Harbor Y1 (††)	...	...	....	...	....	....	22.75	7.5	25.75	11.5	28.25	15	30.75	15.75	31.25	16.75
Lorain, O. N3 (*)	...	...	....	...	....	....	23.75	13.5	26.75	17.5	29.25	21	31.75	20.5	32.25	21.5
Sharon, Pa. S4 (‡)	25	+1.5	17	+6.5	9.5	+12	....	..	....	..	....	...	....	....	....	....
Sharon, Pa. M6	...	...	....	...	....	....	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75	32.25	17.75
Sparrows Pt., Md. B2 (§)	23	+3.5	15	+8.5	7.5	+14	31.7	6.5	24.75	10.5	27.25	13	29.75	14	30.25	16
Youngstown R2 (**)	...	...	....	...	....	....	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75
Youngstown Y1 (††)	...	...	....	...	....	....	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75	32.25	17.75
Wheatland, Pa. W9(§)	23	+3.5	15	+8.5	7.5	+14	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75	32.25	17.75

Size—Inches	2		2½		3		3½		4	
List Per Ft	37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5(‡)	32.75	17.5	34.25	17.5	34.25	17.5	....	....	....	....
Alton, Ill. L1 (§)	*30.75*	*16.25*	*32.35*	*16*	*32.25*	*16*	*23.25*	*6.75*	*23.25*	*6.75*
Benwood, W.Va. W10(††)	32.75	18.25	34.25	18	34.25	18	25.5	8.75	25.5	8.75
Etna, Pa. N2 (†)	32.75	18.25	34.25	19.0	34.25	19.0	25.5	8.75	25.5	8.75
Fairless, Pa. N3	28.25	....	29.75	....	29.75	...	21	....	21	....
Fontana, Calif. K1 (§)	*19.75*	*5.25*	*21.25*	*5*	*21.25*	*5*	*12.50*	*+4.25*	*12.50*	*+4.25*
Ind. Harbor, Ind. Y1 (††)	31.75	17.25	33.25	17	33.25	17	....	....	....	....
Lorain, O. N3 (*)	32.75	22	34.25	20.5	34.25	20.5	....	....	....	....
Sharon, Pa. M6	32.75	18.25	34.25	18	34.25	18	....	....	....	....
Sparrows Pt., Md. B2 (§)	29.75	15.5	32.25	15.5	32.25	15.5	23.5	6.25	23.5	6.25
Youngstown R2 (**)	32.75	18.25	34.25	18	34.25	18.0	25.50	8.75	25.50	8.75
Youngstown Y1 (††)	32.75	18.25	34.25	18	34.25	18	....	....	....	....
Wheatland, Pa. W9 (‡)	32.75	18.25	34.25	18	34.25	18	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; (§), over 9c to 11c inclusive; (††), 10.50c-11.50c; (**), 9.50c; with discounts adjusted on price of zinc at time of shipment; (‡‡), 11c.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.59	19.00
1¼	13	....	23.21	18.77
1½	13	21.40	25.65	20.75
1¾	13	25.28	30.31	24.52
2	13	28.33	33.97	27.48
2¼	13	31.91	38.26	30.95
2½	12	34.63	41.52	33.59
2½	12	38.15	45.74	37.00
2¾	12	41.31	49.53	40.07
3	12	44.05	52.82	42.72

RAILWAY MATERIALS

	Std. No. 1	Std. No. 2	Std. Tee Rails All No. 2	Std. Tee Rails 60 lb Under
RAILS				
Bessemer, Pa. U5	4.45	4.35	4.40	5.35
Ensley, Ala. T2	4.45	4.35	....	5.35
Fairfield, Ala. T2	....	....	....	5.35
Gary, Ind. U5	4.45	4.35	4.40	....
Huntington, W.Va. W7	....	....	....	5.35
Indiana Harbor, Ind. I-2	4.45	4.35	4.40	....
Johnstown, Pa. B2	....	....	...(16)	5.20
Lackawanna, N.Y. B2	4.45	4.35	....	5.35
Minnequa, Colo. C10	*4.45*	*4.35*	....	*5.35*
Steelton, Pa. B2	4.45	4.35	....	5.35
Williamsport, Pa. S19	....	....	....	5.35

TIE PLATES

Fairfield, Ala. T2	5.275
Gary, Ind. U5	5.275
Ind. Harbor, Ind. I-2	5.275
Lackawanna, N.Y. B2	5.275
Minnequa, Colo. C10	*5.275*
Seattle B3	5.425
Steelton, Pa. B2	5.275
Torrance, Calif. C11	5.425

TRACK BOLTS (20) Treated

Cleveland R2	*11.50*
Kansas City, Mo. S5	*11.50*
Lebanon, Pa. B2	*11.50*
Minnequa, Colo. C10	11.00
Pittsburgh O3	*11.50*
Pittsburgh P14	11.00
Seattle, Wash. B3	11.50

JOINT BARS

Bessemer, Pa. U5	5.425
Fairfield, Ala. T2	5.425
Ind. Harbor, Ind. I-2	5.425
Joliet, Ill. U5	5.425
Lackawanna, N.Y. B2	5.425
Minnequa, Colo. C10	*5.425*
Steelton, Pa. B2	5.425

SCREW SPIKES

Cleveland R2	*11.00*

AXLES

Ind. Harbor, Ind. S13	6.75
Johnstown, Pa. B2	6.75

STANDARD TRACK SPIKES

Fairfield, Ala. T2	7.30
Ind. Harbor, Ind. I-2, Y1	7.30
Kansas City, Mo. S5	7.30
Lebanon, Pa. B2	7.30
Minnequa, Colo. C10	*7.30*
Pittsburgh J5	7.30
Seattle B3	7.80
So. Chicago, Ill. R2	7.30
Struthers, O. Y1	7.30
Youngstown R2	7.30

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.25

⅞-in. under..List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	4
⅝-in. & ¾-in.	5
⅞-in. and larger	3
Longer than 6 in.: All diameters	+4
Lag bolts, all diams.: 6 in. and shorter	12
Over 6 in. long	8
Ribbed Necked Carriage	5
Blank	25
Plow	25
Step, Elevator, Tap and Sleigh Shoe	12
Tire Bolts	List
Boiler & Fitting-Up Bolts	23

NUTS

H.P. and C.P., regular & heavy: Square, all sizes	58
H.P., Hex, regular & heavy: ⅝" and smaller	58
⅝" to 1½", inclusive	60
1¼" to 1½", inclusive	62
1⅝" and larger	58
C.P. Hex regular & heavy: All sizes	58
Hot Galv. Nuts (all types): ⅝" to 1½", inclusive	40
⅝" to 1¼", inclusive	43
Finished Hex Nuts: New standard, all sizes	58
Semifinished & Slotted Hex: Regular and heavy, all sizes	58

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼ in. diam & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	47.5—10
Plated finishes	30—10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:

⅝-in. & smaller	38
¾-in. through 1 in.	22
Longer than 6 in.: ⅝-in. and smaller	20
⅝-in. through 1 in.	7

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron:	Cents
98+% Fe, annealed	18.00
Unannealed: Minus 100 mesh	14.50
Minus 35 mesh	10.25
Minus 20 mesh	10.00
Swedish, c.l.f. N. Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags	11.25
Electrolytic iron: Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum: Atomized, 500 lb drums, frgt. allowed: Carlots	32.00
Ton lots	34.00
Antimony, 500 lb lots	32.00*
Brass, ¼-ton lots	28.75-37.50†
Bronze, ¼-ton lots	31.00-39.00†
Copper: Electrolytic	13.50*
Reduced	13.50*
Lead	7.50*
Manganese: Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	89.50
Nickel-Silver, ¼-ton lots	45.75‡
Nickel-Silver, ¼-ton lots	48.50**
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	8.50*
Stainless Steel, 302	91.00
Tin	14.50*
Zinc, ¼-ton lots	18.25-32.00‡
Tungsten Melting grade, 99% 60 to 200 mesh: 1000 lb and over	Dollars 4.95
Less than 1000 lb	5.10
Chromium electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flat, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16"; 1 7/16" to 1 15/16" 4.55c; 1 15/16" to 7 5/16" 4.95c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c H.S.-L.A.
(31) Base; deld. within mill county.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(48) 6-7 gage.

STAINLESS STEEL MILL PRICES

(Representative prices cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	41.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	46.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L	....	....	36.75	....	....	42.75	45.25	49.00	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	62.00	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	53.25	55.50	59.00	62.75	62.75
316L	....	....	52.50	....	56.25	61.00	64.25	67.75	67.75
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	55.25	64.50	66.25	66.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	46.00	50.50	50.50
330	....	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.50	46.75	51.25	54.25	59.25	59.25
403	....	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	35.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	35.25	65.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	....	33.75	38.25	50.25	39.50	40.75	60.75	59.75
501	....	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co., Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%	Sheets: Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.80	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel	41.23	54.18	.....	165.00
Nickel	37.50	50.90	.....	....
Monel	38.90	51.80	.....	....
Copper*	....	.....	46.00	....

	Strip, Carbon Base: Cold Rolled 10%	Cold Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	27.85	35.85	24.00	32.25

* Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; Copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A18.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	*0.31-.315*	W-Cr Hot Work	0.43
Special Carbon	0.37	*1-Cr Hot Work*	*0.44*
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.030
19	*4*	*2*	*12*	...	*3.990*
18.25	*4.25*	*1*	*4.75*	...	*2.245-2.415*
18	4	2	9	...	2.615
18	4	2	....	...	1.705
18	4	1	....	...	1.540
18	*4*	*1*	*5*	...	*2.250*
14	*4*	*2*	*5*	...	*2.185*
13.75	3.75	2	5	...	2.185
13.5	4	3	....	...	1.805
9	3.5	..	....	...	1.115
6	*4*	*2*	....	5	*1.045*
6	4	3	....	6	1.290
2	1.4	1.2	....	...	5.150
1.5	4	1	....	8.5	0.090

Tool Steel producers include: A4, A5, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V8.

PIG IRON

Gross Ton

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	56.50†	....
Woodward,Ala. W15	52.38	52.88	56.50†	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	57.50
Boston, del.	66.65	67.15	67.65	....
Rochester,N.Y., del.	59.02	59.52	60.02	....
Syracuse,N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, del	58.17	58.67	58.67	59.17
Muskegon,Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., del. from Cleve.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
NewYork, del.	....	62.26	63.76	....
Newark, del.	61.02	61.52	62.02	62.52
Birdsboro,Pa. B10	58.00	58.50	....	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, del.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, del.	57.37	57.87	57.87	58.37
McKeesRocks, del.	57.04	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, del.	57.66	58.16	58.16	58.66
Verona,Trafford, del.	58.19	58.69	58.69	59.19
Brackenridge, del.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	56.00	....	....	....
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., del.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	60.50	61.00	61.50	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T2	....	52.50*	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.76	62.26	....	....

* Low phos. southern grade. † Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.00
Buffalo H1	68.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.048% max P)

NiagaraFalls,N.Y. P15	$87.50
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	92.00
Keokuk, OH & Fdry, 12¼ lb pigiets, 16% Si, frgt allowed K2	95.00
Wenatchee,Wash. OH & Fdry, freight allowed K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.00
Rockwood,Tenn. T3	70.00
Steelton,Pa. B2	64.00
Philadelphia, del.	64.00
Troy,N.Y. R2	64.00

This Point is Not Exaggerated

Spare the rod (quality-wise), and you may spoil the brain-child of the product designer.

This point is well taken by many manufacturers who fabricate Brass Rod into component parts for pens and pencils, clocks, lamps, electric and plumbing fixtures, screw machine parts, and what have you. And that's why so many of these manufacturers are what you might call "confirmed addicts" of Bristol Brass Rod.

In pencils, for instance, Bristol "pencil point rod" makes it possible to drill a more concentric hole, with much better uniformity. And all shipments of *all* Bristol Brass Rod have the same clean surface, uniform gage, and high machinability. (You can say that *again*, about Bristol Brass strip, coil and wire.)

Try it out for yourself. Bristol Sales Engineering Service is airborne . . . at your service any time you say.

THE BRISTOL BRASS CORPORATION

has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Boston, Chicago, Cleveland, Detroit, Milwaukee, New York, Philadelphia, Providence, Rochester. The Bristol Brass Corporation of California, 1217 East 6th St., Los Angeles 21. The Bristol Brass Corp. of Ohio, 1607 Broadway, Dayton.

"Bristol-Fashion" means **Brass at its Best**

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Birmingham, Cincinnati, St. Paul, 15 cents; Boston, 10 cents; Seattle and Spokane, Wash., no change.)

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.§	H.R. Alloy 4140††		Carbon	Floor
Baltimore	6.22	7.51	7.78	....	6.89	...	6.88	8.17[4]	12.04	6.92	6.57	7.96
Birmingham	6.35	7.35	8.25[3]	....	6.60	...	6.50	9.10	....	6.65	6.65	8.45
Boston	7.18	8.18	9.47	44.78[5]	7.42	...	7.15	8.55	12.13	7.49	7.37	8.50
Buffalo	6.40	7.45	8.84	....	6.50	...	6.55	7.90	12.20	6.77	6.70	7.80
Carnegie, Pa.	6.38	...	8.30	....	6.72	...	6.51	7.85	....	6.69	6.52	7.64
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.38	7.12	8.30	43.55	6.62	...	6.51	7.50	11.90	6.69	6.52	7.46
Cincinnati	6.48	7.37	8.30	43.80‡‡	6.86	...	7.75	7.85	12.20	6.91	6.86	7.71
Cleveland	6.38	7.38	8.45	45.86	6.72	...	6.57	7.60	11.96	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	....	6.90	7.36	6.79	7.79	11.97	7.16	6.80	7.80
Erie, Pa.	6.35	7.38	8.30	....	6.70	...	6.50	7.45[4]	....	6.69	6.52	7.64
Houston	7.15	7.60	9.23	....	7.45	9.30	7.45	9.30	....	7.35	7.20	8.55
Los Angeles	7.25	9.00	8.85	50.15	7.55	11.20	7.15	9.10	12.50	7.35	7.20	9.25
Milwaukee	6.47	7.47	8.21	....	6.71	...	6.60	7.69	11.99	6.86	6.61	7.63
Moline, Ill.	6.53	7.47	8.30	....	6.77	...	6.63	7.65	....	6.81	6.68	...
New York	7.28	8.08	8.37	44.15	7.66	...	7.60	8.63[6]	12.18	7.43	7.48	8.78
Norfolk, Va.	6.90	...	...	....	7.00	...	7.00	8.50	....	7.00	6.49	7.51
Philadelphia	6.19‡‡	7.13	8.08	41.98[5]	6.96‡‡	8.80	6.74	8.19[8]	11.74	6.54‡‡	6.30‡‡	7.34‡‡
Pittsburgh	6.38	7.38	8.30	43.50	6.72	...	6.51	7.85	11.90	6.69	6.52	7.64**
Portland, Oreg.	7.60	8.45	9.05	....	7.65	...	7.35	10.65	....	7.25	7.25	9.15
Richmond, Va.	6.43	7.39	8.67	....	6.77	...	6.71	8.08	....	7.08	6.85	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.89	12.19	7.09	6.81	7.93
St. Paul	6.84	7.78	8.61	....	7.08	...	6.94	8.06	....	7.12	6.99	8.12
San Francisco	7.55	8.95	9.35	48.15	7.80	...	7.35	10.05	13.20	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	50.50	8.20	...	7.80	10.95	13.65	7.75	7.80	9.60
Spokane	8.15	9.40[7]	9.80	....	7.60	...	7.60	10.55[8]	14.10	7.25	7.35	9.40
Washington	6.71	7.65	8.35	....	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; †prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extras excluded); ‡includes 35-cent special bar quality extra; §as rolled; **¼-in. and heavier; ††as annealed. ‡‡City delivery charge is 10 cents. §§plus $2 for crating. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston where base is 10,000 lb. [3]—500 to 9999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 lb to 3999; [8]—under ¼ in.; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

Warehouse Business in Summer Doldrums

Many customers of distributors postponing until fall most major purchases, indicating substantial pickup in sales after Labor Day. Price adjustments continue

Cleveland—Steel distributors in this area do not anticipate any noticeable improvement in demand volume over remainder of this month and August. Current business is down substantially from that in June, some sellers noting an increase in size of orders being received but a drop in the number of individual purchases.

Explanation for this somewhat mixed trend is found in the lessened needs of manufacturers during July and August, attributable to manufacturing suspensions for mass vacations. In recent years such suspensions have cut sharply into July-August volume of the warehouses. This year the impact seems even more severe.

Indications are July order volume will be down from that of June and, August business is not expected to show much gain over that of July. However, a sharp pickup is seen by the steel merchants after Labor Day.

Philadelphia—Following recent advances on several plain hot carbon products, distributors have increased galvanized sheets, now quoting 10 gage at 8.08c, f.o.b. warehouse. They also are studying the situation in cold-finished bars, with some revision probable. Meanwhile, business is spotty. July will likely be the slowest month this year, certainly the slowest to date.

Chicago—Warehouse sales held up well during first half of July, giving support to the belief that this month may better June by a shade. This is the reverse of mill experience but is explained by the fact smaller manufacturing plants which buy the bulk of their steel requirements from warehouses do not follow the vacation shutdown practice of the larger plants.

Pittsburgh—The summer slowdown will probably continue through August, distributors say. Customers

STEEL IMPORT PRICES

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast*
Deformed Bars, Intermediate, ASTM-A-305	$4.75	$4.75	$4.70	$5.03
Bar Size Angles	4.50	4.50	4.40	4.73
Structural Angles	4.50	4.50	4.40	4.73
I-Beams	4.50	4.50	4.40	4.73
Wide Flange Beams	4.80	4.80	4.80	5.08
Sheet and Plate, 10 gage, 11 gage, 5' x 10'	5.50	5.50	5.45	5.78
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.50	25.70	25.50	26.34
Barbed Wire	6.75	6.75	6.75	7.08
Merchant Bars	6.75	4.75	4.70	5.03
Hot-Rolled Bands	4.90	4.90	4.85	5.18
Wire Rods, Thomas Commercial No. 5	4.77	4.84	4.82	5.09
Wire Rods, O-H, Cold Heading Quality No. 5	5.23	5.30	5.28	5.55
Bright Common Wire Nails, 8d	6.85	6.95	6.90	7.15

*Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling.

Sizes O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

are postponing until fall most major purchases. Sales managers comment that fabricators' orders for September are for increased tonnage, indicating the possibility of a pickup at that time.

Boston — While warehouses are marking up steel prices there are some doubts as to the early effect on volume recovery. There are continuing soft spots on slower moving carbon products. Distributors did no hedge buying before the last mill increases, being more concerned with moving out what they had in stock against slow demand. An increasing number of consumers shy away from steel costs at the warehouse level. Standard structurals at 7.49c and carbon plates at 7.37c, f.o.b., warehouse, are cases in point. Shops fabricating these products can not afford to buy much tonnage and still get out whole on their price estimates.

San Francisco — Distributors describe their volume as good but not heavy. Summer dullness is appearing. Most buying is for the job in hand, with little ordering for inventories noted, a policy that has been in vogue for several months.

Cincinnati—Vacations are pushing July business volume down. Business would be way off if it were not for such good volume items as structural steel. Hot-rolled sheets are selling steadily, but the market for cold-rolled sheet and strip is slow.

Los Angeles—Warehouses in this area have not yet adjusted their prices to reflect mill increases. With volume reduced by widespread shutdowns for vacations, many distributors are expected to hold their current prices and absorb the mill increases at least through August.

Wire . . .

Wire Prices, Page 132

Boston—Heaviest demand for wire products centers in construction, notably highways and bridges, including pre-stressed concrete sections. Wire cable guard rail, stock wire fence, welded wire fabric and strand cable buying is active.

Connecticut is reconstructing large sections of highway wire rope railing, contracts going to Webster & Webster, Inc., East Haven, Conn., and National Fence Co., Meriden, Conn., total approximating $200,000. Delivery on this type of material is prompt, from distributors frequently.

Orders for manufacturers' wire are slow with consumers indicating some increase for September delivery.

Sheet Market Continues Sluggish

July order volume disappointing and little improvement is seen before fall. Vacation suspensions at consumer plants reflected. Galvanized moving in good tonnage

Sheet and Strip Prices, Page 130 & 131

Chicago—July sheet business isn't striking the pace expected and it is being reflected in sheet mill and steelmaking operations. Too many plant closings for vacations are cited as the reason with deliveries varied during the period. Galvanized sheets are holding strong, some makers being fully booked through September.

Philadelphia — Galvanized sheets are in tightest supply of the major sheet items. Much of this goes back several weeks to the placing of grain storage bins by the government. However, there has been a good demand from other directions, including standard housing needs and air-conditioning requirements. Producers of hot and cold-rolled sheets believe that July shipments will mark the low point of the year.

New York — Tonnage grades are moving at less active rate than in June, with little forward buying. Some producers of hot and cold-rolled sheets look for demand to drag for at least another few weeks, or until the vacation season nears an end. Buying of stainless is on a hand-to-mouth basis. Some producers can make deliveries out of stock, and so long as this situation prevails, business in stainless will likely continue largely on a spot basis. Low silicon sheets can be had without too much delay, but the high grades are in short supply.

Pittsburgh—Automotive orders for cold-finished sheets continue low. With no pickup expected in the near future, July and August shipments may be the low point of the year. Slowness may extend into September.

Fourth quarter pickup will be gradual, producers believe. Business

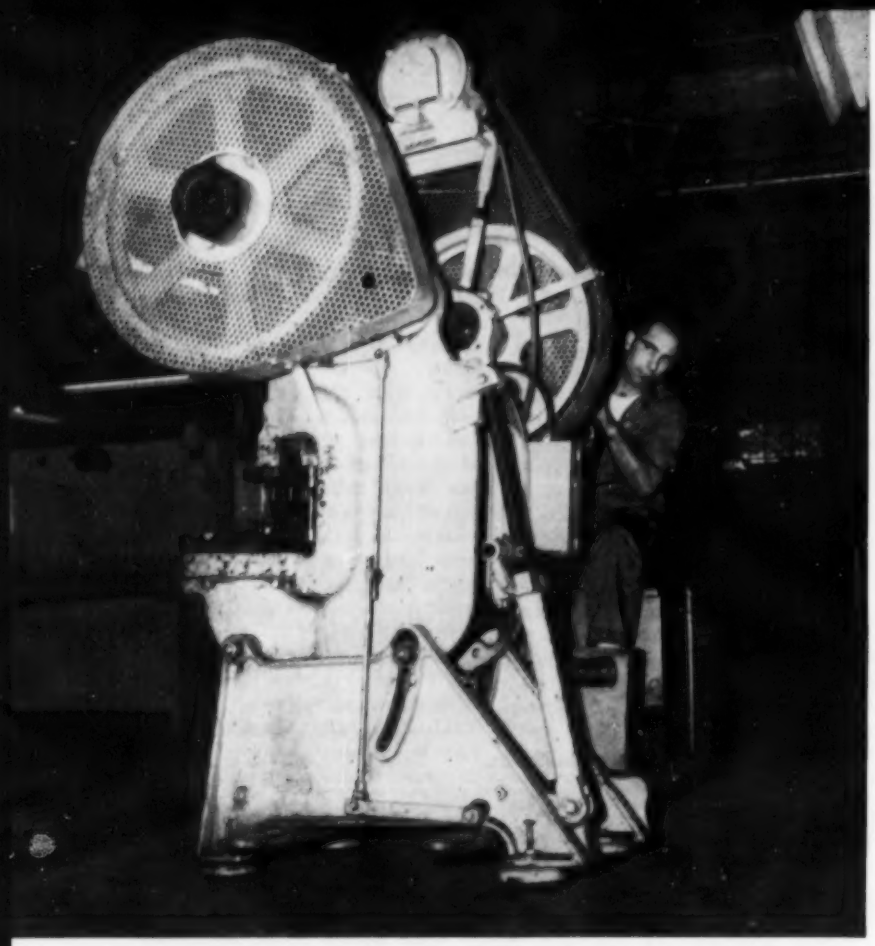
(*Please turn to page* 138)

Steel Shipments During May and First Five Months

(All grades. Net tons)

Products	May Shipments				Year To Date			
	Carbon	Alloy	Stainless	Total	Carbon	Alloy	Stainless	Total
Ingots	14,558	9,962	582	25,102	86,484	60,767	7,692	154,493
Blooms, etc.	83,135	26,531	909	110,575	487,527	136,355	5,314	629,196
Skelp	11,567	.....	.....	11,567	49,675	.....	.....	49,675
Wire rods	64,006	1,150	244	65,400	294,399	5,916	1,803	302,118
Shapes	351,124	1,469	27	352,620	2,072,095	12,257	56	2,084,408
Piling	31,878	.....	.....	31,878	163,760	.....	.....	163,760
Plates	422,865	17,268	1,498	441,631	2,430,839	98,327	6,963	2,536,129
Rails	76,649	.....	.....	76,649	684,728	112	.....	684,840
Rails, other	5,831	.....	.....	5,831	41,966	.....	.....	41,966
Joint bars	5,573	.....	.....	5,573	41,207	.....	.....	41,207
Tie plates	24,401	.....	.....	24,401	140,760	.....	.....	140,760
Track spikes	6,980	.....	.....	6,980	37,498	.....	.....	37,498
Wheels	14,675	202	.....	14,877	96,196	560	.....	96,756
Axles	3,414	13	.....	3,427	28,540	92	.....	28,632
Bars H-R	375,707	115,288	2,781	493,776	2,038,391	583,558	14,943	2,636,892
Bars—Reinforcing	162,525	.....	.....	162,525	656,853	.....	.....	656,853
Bars C-F	78,953	13,367	2,850	95,170	420,314	72,737	15,716	508,767
Standard pipe	200,882	87	.....	200,969	907,739	145	5	907,889
Oil country	171,591	26,035	.....	197,626	891,893	123,427	.....	1,015,320
Line pipe	256,511	2	.....	256,513	1,224,542	6	.....	1,224,548
Mech. tubing	40,105	14,205	281	54,591	223,832	73,665	1,793	299,290
Press. tubing	16,245	4,033	1,350	21,628	97,105	20,707	7,898	125,710
Tool steel	1,072	5,228	.....	6,300	5,920	31,679	.....	37,599
Wire—drawn	214,406	2,198	1,243	217,847	936,588	12,963	7,508	957,059
Nails—Staples	51,279	.....	.....	51,279	233,222	.....	2	233,224
Barbed wire	16,182	.....	.....	16,182	74,337	.....	.....	74,337
Fence	35,361	.....	.....	35,361	161,264	.....	.....	161,264
Bale ties	8,373	.....	.....	8,373	21,211	.....	.....	21,211
Black plate	63,483	.....	.....	63,483	290,195	.....	.....	290,195
Tin Plate HD	145,783	.....	.....	145,783	559,326	.....	.....	559,326
Tin Plate Elec.	461,026	.....	.....	461,026	1,770,853	.....	.....	1,770,853
Sheets H-R	465,084	16,179	1,111	482,374	2,403,286	82,295	5,856	2,491,667
Sheets C-R	766,172	4,155	8,062	778,389	3,896,237	20,518	36,382	3,953,137
Sheets Gal.	201,671	.....	.....	201,671	920,350	350	.....	920,700
Sheets—other coated	14,084	.....	.....	14,084	71,407	.....	.....	71,407
Sheets, enameling	15,714	.....	.....	15,714	73,981	.....	.....	73,981
Electrical Sheets & strip	6,566	40,415	.....	46,981	41,046	223,047	.....	264,093
Strip H-R	122,393	2,314	370	125,077	589,589	9,003	1,090	599,682
Strip C-R	80,259	1,658	12,618	93,935	465,528	5,422	69,790	540,750
Totals	5,088,083	301,159	33,926	5,423,168	25,630,693	1,573,908	182,441	27,387,042

Data from American Iron & Steel Institute



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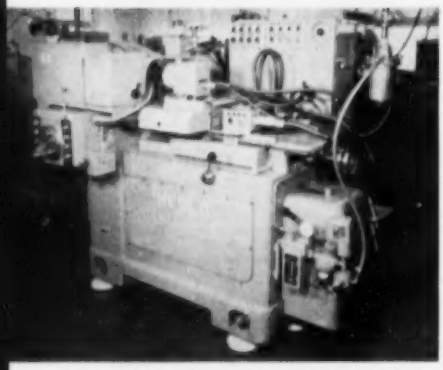

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SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

(*Continued from page* 137)

in that quarter is expected to be on a par, or better, than second quarter sales.

Boston—With firm commitments on mill books small in volume and new buying light, reaction to the higher prices on flat-rolled steel is not fully sensed nearly one month after the latest round of advances. This is true notably as to electrical sheets on which the increase was the largest, $7 per ton for No. 22 gage, cut lengths.

That many consumers of sheets and strip will find it difficult to absorb both increased steel and wage costs in the current competitive markets goes without question. This applies especially to stamping shops, which, for months, have been operating on narrow margins.

The only relatively tight supply product in the flat-rolled category is galvanized. Major reason for this is the grain and supplemental corn storage bin program. Mills are loaded with this tonnage for prompt delivery, which has pushed other orders out of schedule.

Cleveland—Not much change in demand for the light flat-rolled products is expected to develop until next month by which time the vacation season will be drawing to a close and preparations will get really going for the fall manufacturing campaign.

The higher price schedule, recently effected, is expected to stick despite continuance of stiff competition. Sellers, generally, are of the opinion September volume will be up noticeably, and that fourth quarter tonnage will be heaviest for the year.

Study of steel shipment figures for the first five months of this year, just released by the American Iron & Steel Institute, show shipments of the flat-rolled items are down sharply from a year ago. Hot-rolled sheet tonnage is off 25 per cent, cold-rolled sheets 15 per cent, galvanized sheets 4 per cent, enameling sheets 20 per cent, electrical sheets 26 per cent, hot-rolled strip 41 per cent and cold-rolled strip 43 per cent.

Cincinnati—The big news here in the sheet and strip market is the installation of a new four-high reversing strip mill at Newport Steel Corp. This $750,000 mill will enable Newport to roll lighter, more uniform gage steel. The new machinery is expected to begin rolling Aug. 1. It will produce down to 16 gage strip.

St. Louis—Fairly substantial demand for sheets in this district through most of first half-year be-

gan weakening July 1 as consuming plants in the area shut down for vacations. Coated sheets and galvanized roofing, however, were exceptions. Mills anticipate a pickup in orders in August and September.

Los Angeles—Producers are anxiously eyeing attempts to strengthen eastern influence in the western market. One Ohio company is constructing a warehouse in Los Angeles for distribution of specialty strip steel products.

Steel Bars . . .

Bar Prices, Page 130

Cleveland — Some manufacturing plants have resumed operations after having been closed for vacations since just before the July 4 holiday. Indications are bar consumption will rise steadily from here on though no sharp pickup in demand is anticipated before late next month. With prompt shipment tonnage available from the mills, consumers are thought likely to move cautiously in ordering for inventory over coming weeks.

Bars were probably hardest hit by the slack demand of the past year of any of the major steel products. Data compiled by the American Iron & Steel Institute show how shipments of hot-rolled bars in the first five months this year were off 38 per cent from the like period of 1953, while concrete reinforcing bar shipments were down 17 per cent, and cold-finished bars 51 per cent.

Chicago—Dip in bar consumption can be anticipated in the next few weeks, particularly in the important farm implement and truck sectors. International Harvester is furloughing approximately 5000 workers this month in 11 cities. Around 60 per cent will be in Chicago and other Illinois cities. Sales of both farm equipment and trucks have fallen below production schedules made last spring. Generally, all classes of bars are readily available for prompt shipment.

Boston—Not much testing of new bar prices is expected until buying for September-October starts. This will open with a buyers' market as far as supply is concerned. Shipments from stock will be possible on a considerable range of both carbon and alloy stock. Production-distribution setup is more competitive on bars in this section than for most products and pressure consequently is likely to be heavier. Forge shops, bolt and screw machine product margins are lower and most will find it hard to absorb additional costs.

New York—Hot-rolled carbon bar specifications are coming out a little

(Advertisement)

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better with indications that August shipments will probably run ahead of those for July. Most sellers believe that the low ebb of the year is now passing and that the trend will continue upward until late in the fall at least. This applies not only to hot carbon bars, but to cold-drawn as well, and specialties.

Philadelphia—Bar business in August will probably be a little better as there will be fewer vacations at consuming plants. Also, there is a continued paring of consumer inventories, which, one of these days, is going to lead to a definite pickup, especially once the seasonal doldrums are past. Current orders are fairly diversified. But definitely dragging, among the major consuming outlets are the railroad, machine tool and automotive industries.

Cincinnati — Demand for carbon bars is holding up well. Alloy bars, which were off, have picked up.

Pittsburgh—Although sales remain slow, it's not due to any resistance of higher bar prices. Seasonal factors contribute to the July sales lag. An over-all gain is predicted in August shipments. Several area consumers are reopening plants following vacations.

Semifinished Steel . . .

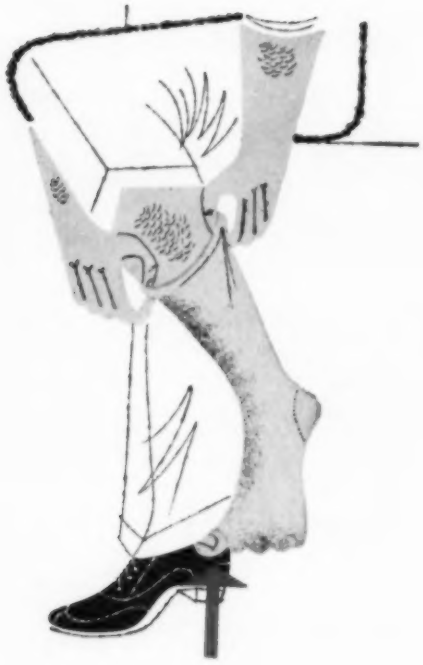
Semifinished Prices, Page 130

Chicago — Steelmaking operations here were scheduled at only 68 per cent of capacity last week, compared with a revised 70 per cent the previous week. The performance is short of what had been expected and is explained by vacation influences — some at steelmaking plants but mostly at consumer plants.

Closing of manufacturing plants this year is more general than had been expected and in some instances holdups on deliveries of raw materials have been requested. In previous years arrangements usually were made to take in these supplies during down periods.

Los Angeles — With inventories sufficient to cushion an anticipated slab curtailment resulting from shutdown for overhauling of its blooming mill, Kaiser Steel Corp., Fontana Works, has dropped ingot production to 80 per cent of capacity. During June and most of July Kaiser operated close to 120 per cent of capacity.

San Francisco—While June business was the best experienced by one mill in this area to date this year, prospects for July are less bright. A good third quarter, however, is expected.



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Crucible Hollow Tool Steel Bars are saving time and money for more and more members of the metalworking industry. By using these hollow bars you eliminate drilling and boring operations, increase machine capacity and cut scrap losses.

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54 years of Fine steelmaking **HOLLOW TOOL STEEL**

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CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C7% approx.) Base price per net ton $200, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; and Portland, Oreg.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.
(Mn 79-81%) Lump $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max 0.15% C grade from above prices, 1c for max 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Min carloads, 30c; 2000 lb to min carloads, 35c; 250 lb to 199 lb, 34c; less than 250 lb, 37c. Premium for hydrogen-removed metal, 0.75c per lb, f.o.b. cars, Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed, 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above price. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, C.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max, 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 10.8c per pound of contained silicon; 1" x down, bulk 25.25c per pound of contained chromium plus 11c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14; less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.80c per lb of contained Si, carload packed 12.40c, ton lot 13.85c, less ton 15.5c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 12.2c per pound contained silicon; carload packed 13.55c; ton lots, 14.75c; less ton, 16.1c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.8c per lb of contained Si, carload packed 15.1c, ton lot 16.25c, less ton 17.5c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb, smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ¾ lb of Si). Contract, c.l. bulk 12.65c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.3c per lb of briquet. Packed c.l. 7.10c, ton lot 7.9c, less ton 8.8c. Delivered. Spot, add 0.25c.
(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.45c. Packed c.l. 7.25c, ton lot 8.05c, less ton 8.95c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $9.50 per lb of contained Cb, less ton $9.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, Pa., $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

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Alloymet 2030 (65% Nickel 30% Copper 5% Iron)*

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ORES–COKE–REFRACTORIES

Prices as reported to STEEL; changes shown in italics.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 65%	20.00
North African hematite (spot)	20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$23.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, $1.02-$1.05 per long ton unit c.i.f. U. S. ports, duty for buyer's account; 46-47%, $0.95-$0.97.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$21.00-$22.00
48% no ratio	34.00

Domestic

(Rail nearest seller)

48% 3:1	$30.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines, unpacked	$1.00

Antimony Ore

Per unit of lb content, c.i.f. seaboard

50-60%	$2.40-$2.80
65% min.	$3.40-$3.50

Vanadium Ore

Cents per lb. V_2O_5 content, deld. mills

Domestic	31.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, O., Hays, Pa., $120; Niles, O., $120; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.60; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill., $258; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Nario, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-$15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	2..12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	26.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

FLUORSPAR

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

ELECTRODES

(Threaded with nipple, unboxed f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Per 100 lb
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5⅛	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

Tubular Goods . . .

Tubular Goods Prices, Page 133

Pittsburgh—A predicted slight decline in second half drilling operations will probably not have a major effect on seamless shipments, producers say. Their sales of that product continue strong.

Some specialty products are improving in demand, after several slow months. Sales of buttweld are also strengthening.

Boston—Where sales goals have replaced allotments, pipe producers are falling short on buttweld, but meeting or surpassing marks for seamless. Direct shipments hold well, including 550 tons for an oil installation, providence, R. I. Orders from distributors are light for August. Most jobber stocks are holding up better than expected. Close to 75-80 per cent of buttweld shipments are from stock.

Philadelphia — Commercial pipe business is running slightly ahead of that last month. However, price weakness still prevails at the resale level.

Plates . . .

Plate Prices, Page 136

Philadelphia — Of all the major products, plates still appear to be moving the most slowly. Producers haven't nearly enough tonnage to occupy their facilities, and most can make delivery promises within a week to 10 days. August business may pick up as there should be fewer suspensions at consuming plants for mass vacations. But there is little yet in the way of tangible orders to support this belief, and most producers doubt there will be appreciable gain before September or later in the fall.

The Conshohocken, Pa. producer will suspend plate operations Aug. 7 for three weeks for improvements, including installation of wider tables and rotary shears, and completion of work on a rotary furnace. Plate mill workers will apply two weeks of the time required for the work to vacations.

Boston—Although plate orders are light with mills not equalizing on delivered prices, eastern Pennsylvania producers are highly competitive for the limited tonnage going. August openings for carbon grades are general. Tank and structural shops are relatively active, but new volume with the former is off some. Most buy only to meet fixed requirements and are not making up inventory. With deliveries down to two weeks they see no need. In structural fabricat-

ing more structural plate arch bridge inquiry is up. Plate girder estimating is also heavier.

New York—Plate sellers here anticipate a slight gain in orders during August, but they see no appreciable pickup before fall. Shipments in the month now closing have been the lowest so far this year.

Pittsburgh — Construction requirements of plate partially bolster a currently slow market. Sales to shipbuilders and railroad car manufacturers are too low to generate much optimism among plate producers. Shipments are expected to continue low through next month.

Los Angeles—With petroleum activity increasing, fabricator's plate requirements are rising. Both eastern and western mills are making steady deliveries.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 133

San Francisco— Bethlehem Pacific Coast Steel Corp.'s bolt and nut plant in South San Francisco, one of three the company has on the coast, has been operating at about 50 per cent of capacity for nearly a year.

Structural Shapes . . .

Structural Shape Prices, Page 130

Boston—More tonnage is being estimated, notably bridges, approximating 5000 tons. Contracts include 7880 tons, superstructure, Sakonnet river bridge, Riverton, R. I.

To meet heavier demand for fabricated steel outlook for plain material, standard and wide-flanged beams, is ample. This despite the fact Pittsburgh district producers are not equalizing to meet eastern Pennsylvania delivered prices. Most bar shape tonnage is equalized, however.

Fabricating shops are trying to pass on the $3 increase in plain material costs, but varying base prices and sharp competition still prevailing, will soon establish the degree of success.

New York — Structural contracting is featured by award of 19,500 tons for the superstructure of a turnpike bridge over the Delaware river, near Burlington, N. J. Action on two or three other sizable jobs is expected shortly. Despite good demand, competition among fabricators is brisk.

Philadelphia—While new tonnage is light, various fabricating shops are working overtime. This doesn't deter them from competing rather sharply, however, and keeps shapes at the top of the list in point of activity. Several sizable projects are active, mostly bridgework.

Pittsburgh — Orders for standard structural shapes are declining slowly, but wide flange beams are selling well. While industrial construction is not as active as last year, commercial construction and bridge building should continue to demand heavy structural shipments for most of this year.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

19,500 tons, superstructure, turnpike bridge, Burlington, N. J., and a point near Edgely, Pa., to American Bridge Division, U. S. Steel Corp., Pittsburgh; also included in the lump bid of $10,991,362.50 were 1800 tons of reinforcing steel and 13,400 feet of parapet railing.

13,000 tons, coliseum, Triboro Authority, Columbus Circle, New York, through Walsh, Fuller & Slattery, building engineers who are operating jointly as general contractors, to Bethlehem Steel Co., Bethlehem, Pa.

7880 tons, bridge superstructure, Sakonnet river, Tiverton, R. I., to Harris Structural Steel Co., New York.

4750 tons, towers, American Gas & Light

(*Please turn to page* 147)

Now Available . . .

ZIRCONIUM METAL

- To meet industry's severest corrosion problems —acids and alkalis.
- Available in rods, sheets, plates, tubes, strip, and wire.
- Can be fabricated by standard methods of welding, forging, extruding, etc.
- Standard ASTM 2" round corrosion specimens available.
- Engineering assistance is offered.
- Melted from sponge produced by the Carborundum Co.—major supplier to AEC.

Write for technical data sheets, and price schedules.

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Famous Manufacturers
POINT THE WAY TO SOLVING
YOUR PUZZLING PROBLEMS
with SETKO Set Screws

You're in "good company" when you put your set screw problems up to "Setko". These trademarks represent only a few of the many hundreds of famous products in which regular Setko Set Screws are used, or special types designed to meet some requirement of greater holding power, close precision setbug, resistance to vibration, etc. One of the following 4 developments may be just what you need to insure against set screw failure.

Send for FREE Bulletins

Improved "Zip-Grip" Self-Locking Set Screw. Will lock to stay at any point.

Fluted Socket Head Long approved by Federal Standards.

"No-Cup" Set Screws. Deeper cup-penetration due to 42½° sharper angle.

Off-Set Self-Locking Set Screws. Provide powerful spring-locking action.

Bendix WARNER SKIL Dupli-Voice BOONE HOWARD Consonata Sunbeam Robertshaw-Fulton BORENG Bell & Howell Hunter Dominion DEXTER HAMILTON BEACH Servel BEAM Kitchenaid Cooper Friden OAK MFG. CO. Walsco Cincinnati

Set Screw & Mfg. Co.

Send for FREE New Catalog No. 19. Illustrations... applications, data, sizes, prices on full line.

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Simply check items in which you are interested. Write your name and address in margin of this page, tear out and mail.

SET SCREW & MFG. CO. 157 Main Street — Bartlett, Ill.

We specialize in solving puzzling set screw problems.

MOTIOGRAPH Hotpoint PENN CONTROLS THE VAN LINE BENJAMIN 60B ED

Raymond Loewy
IN HIS NEW BOOK says:

"A nuisance that we have to guard against is defacement. One of humanity's strongest urges is the desire to engrave one's name on anything that can be dented, scratched, or embossed. Some go so far as to engrave (or tattoo) their names on their own skins.

In transportation it is a major problem. We have to protect bulk-heads, pier panels, toilet rooms, etc., from the urge of Joe to sketch a little fresco announcing to the world that he loves Julie. Or that the sitting position is favorable to the thinking process; or that So-and-So is a so-and-so, etc., etc. This calls for the use of certain non-defaceable materials."

(From "NEVER LEAVE WELL ENOUGH ALONE")
—Raymond Loewy

Pattern 5-BWL

send for new 16-page complete catalog . . . on company letterheads please, or see Sweets Design File 1a/Ri.

• RIGID-TEX METALS are three-dimensional, design-strengthened and textured to conceal all dents, scratches, doodles and scuffs—a feature that reduces maintenance costs considerably in an unlimited variety of product applications. Other features: added rigidity; reduced gages for *metal conservation;* impact resistance; buckling strength; glare resistance; versatile fabrication.

RIGID-TEX METALS
RIGIDIZED METALS CORPORATION
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50 Warehouses and Sales Representatives in All Principal Cities Throughout the U. S. and Canada
U. S. & Foreign Patents

There's a reason 71%* of all popularly-priced Tool and Cutter Grinders sold in 1953 were "Knock-Outs"

MODEL B860

Will do anything that machines costing 2 or 3 times more will do . . . yes and in less time.

Distributed Only Through Franchise Dealers

K. O. LEE CO.
ABERDEEN S. D.

*Sales Statistics Furnished on Request

(*Concluded from page* 145)

Service Co., to American Bridge Division, U. S. Steel Corp., Pittsburgh; 2800 tons for towers near Delphos, O., and 1950 tons, near Hoagland, Ind.

300 tons, structural steel and wire rope, natural gas line suspension bridge, over the Mississippi river, Grand Tower, Ill., for Texas Illinois Natural Gas Pipeline Co., Chicago, to American Bridge Division, U. S. Steel Corp., Pittsburgh; structural steel will be fabricated at Gary, Ind., and the rope at the Trenton, N. J., plant of the American Steel & Wire Division, U. S. Steel Corp.

565 tons, Rumford Point bridge, Androscoggin river, Rumford, Me., to Bethlehem Steel Co., Bethlehem, Pa., through Callahan Bros., Mechanics Falls, Me., general contractor.

325 tons, state bridges, Route 128, Westwood Dedham, Mass., to Tower Iron Works, Providence, R. I., through S. & M. Construction Co., Providence, general contractor.

260 tons, 5-story Hadassah administration building, 63-71 East 52nd street, New York, to Schacht Steel Construction Inc., that city; Emery Ross & Son, architects.

STRUCTURAL STEEL PENDING

5300 tons, Supreme Court building, Brooklyn, New York, Winninger Construction Co., Rockefeller Plaza, Manhattan, New York, low on general contract.

2100 tons, railroad grade crossing elimination, Winchester, Mass., bids July 27, Boston.

1880 tons, state bridge work, Lehigh county, Pa., H. L. Williams, York, Pa., low on general contract.

750 tons, railroad grade crossing, Lincoln Square project, Worcester, Mass., bids July 27.

700 tons, transit shed, naval station, Newport, R. I.; Gilbane Building Corp., Providence, R. I., general contractor.

700 tons, six state bridges, Duxbury-Kingston, Mass., bids July 27, Boston.

354 tons, bridge, State Highway & Bridge Authority, Bucks county, Pa., bids in August; also 140 tons of reinforcing steel.

100 tons, bridge and cofferdams, Long Sault dam, St. Lawrence county, New York; bids Aug. 6, Power Authority, State of New York, New York city; 1030 tons, steel sheet piling under alternate 1, schedule 2, or 4050 tons, alternate 2, schedule 3.

REINFORCING BARS . . .

REINFORCING BARS PLACED

120 tons, addition, county court house, Worcester, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; S. Volpe & Co., Boston, general contractor; 715 tons, fabricated structural steel to Grossier & Shlager Iron Works, Somerville, Mass.

REINFORCING BARS PENDING

965 tons, including 700 tons mesh, Lincoln Square project, Worcester, Mass.

725 tons, bridge piers, Portland-Augusta extension, Maine turnpike; also, erection only, 1740 tons, fabricated structural steel, 13 bridges, delivered f.o.b. Lewiston, Me., contract 217.

346 tons, Garden State parkway, contract No. 182, section 1, Bergen county, N. J., bids Aug. 9.

165 tons, bridge piers and highway, Maine turnpike, Portland-Augusta extension, contract 220, bids July 29, Augusta, Me.

140 tons, bridge work, Bucks county, Pa., bids Aug. 6; also required are 354 tons of shapes.

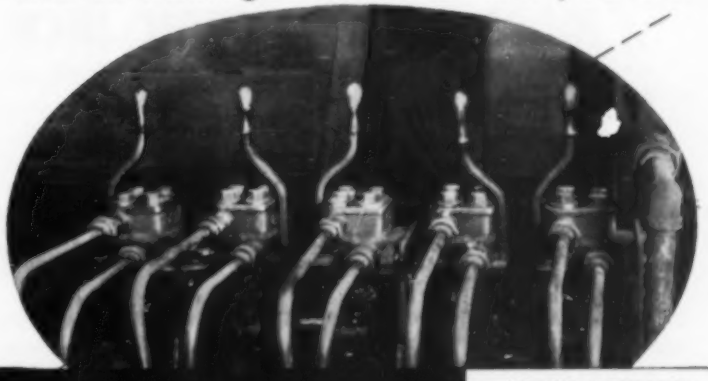
100 tons, state bridge work, Lancaster county, Pa., bids Aug. 6.

RAILS, CARS . . .

RAILROAD CARS PENDING

General Services Administration, Government Emergency Procurement Service, Washington, 5000 freight cars, comprising box cars of narrow gage and gondolas of wide gage, for Indian Railways, India; bids opened, with three American car builders and 29 foreign builders submitting figures; foreign bids were substantially lower than American bids; no awards have yet been announced.

You'll have fewer shutdowns due to damaged valve seats if you use



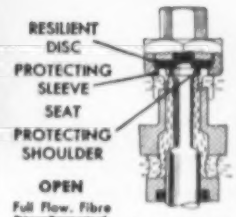
HOMESTEAD
Protected Seat
HYDRAULIC OPERATING VALVES

They give Longer, Low Cost Service

Production stoppages, due to damaged seating elements, are practically eliminated by the exclusive "Protected-Seat" built into every Homestead Hydraulic Operating Valve.

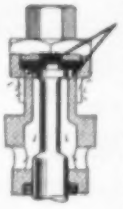
Protection against "wire drawing" or "cutting" of the seat is provided by a closely fitted protecting sleeve and stem shoulder which surround the metal seat and resilient disc in such a way that fluid-flow is all but shut off while the seat face and disc are still widely separated. With velocity thus reduced to almost zero, the most frequent causes of leakage and resultant shutdowns are eliminated. Grit, or other foreign material in the line is usually absorbed by the disc without damage to the valve seat. Records of 18 months continuous maintenance-free service are common.

HERE'S HOW THE PROTECTED SEAT WORKS



OPEN
Full Flow. Fibre Disc Protected.

Large space to reduce velocity to practically zero. This ring of water is squeezed out in closing—cushions seating.



CLOSING OR OPENING
Flow practically stopped by close fitting sleeve and stem shoulder, before seat and disc make contact. This prevents wire drawing. Trapped water cushions closing.

CLOSED
Protected resilient disc against metal seat assures drop tight performance, long life, accurate control, and low maintenance.

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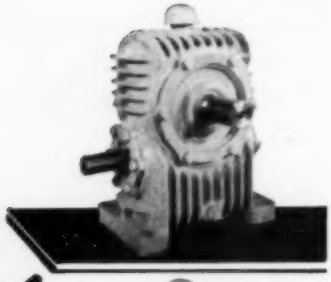
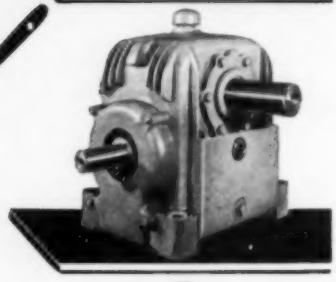
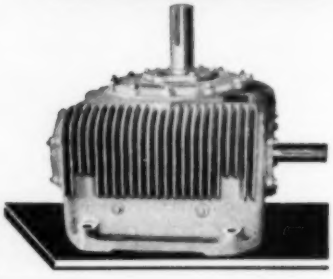

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The Cone-Drive story's an amazing one—choose from over 190,000 standard stock models with ratios from 5:1 to 4900:1 to handle loads from fractional to 800 hp.

Get all the facts in Bulletin 8901-50.

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DOUBLE ENVELOPING GEAR SETS & SPEED REDUCERS
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up to 125-TON CAPACITY
VICTOR R. BROWNING & CO., INC. WILLOUGHBY (Cleveland), OHIO

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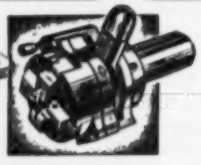
STAMCO, Inc., New Bremen, Ohio

H&G Insert Chaser DIE HEADS



famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.
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IF IT'S *RIVETED* YOU KNOW IT'S SAFE
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PERFORATED METALS
TO YOUR REQUIREMENTS
FOR
ALL INDUSTRIAL USES
ARCHITECTURAL GRILLES
SEND FOR CATALOG NO. 39
DIAMOND MFG. CO.
BOX 32 WYOMING, PA.

Exports Giving Scrap Boost in East

Tonnage earmarked for shipment abroad small but sufficient to make dint in district supplies. Domestic demand continues slow with prices largely nominal

Scrap Prices, Page 150

Philadelphia—New buying of open-hearth steel scrap continues mostly for export. Not that this business is so heavy but that domestic demand is so slight. Virtually all tonnage going to district mills is against back orders. However, there is a sufficient amount being booked here and in certain adjacent areas for shipment abroad to create more than a mere dint in supply. If this buying continues through August, as now expected, the total amount may be fairly impressive.

Meanwhile, influence of export prices is reflected in higher quotations to domestic consumers on major open-hearth grades. As a direct result No. 1 heavy melting and No. 1 busheling grades are now higher at $24.50, delivered, No. 2 heavy melting $22.50, and No. 2 bundles $19 to $20.

While not being sought for export, mixed borings and turnings are higher at $16, delivered, short shovel turnings at $18, and low phos structurals and plate at $29 to $30. Couplers, springs and wheels are up $1 to $32 delivered, and rail crops are up similarly to $42. Cast grades show little change.

Pittsburgh—Latest railroad scrap sales resulted in price rises averaging $1 a ton. No. 1 railroad heavy melting is now quoted at $31-$32. Prices on open hearth and cast iron grades remain level. Trading is at low ebb, due to vacations at mills and foundries.

New York—Steel scrap exporters are taking the play away from domestic buyers for the time being at least along the eastern seaboard. Several cargoes have already left from, or are being accumulated at such ports as New York, Philadelphia, Baltimore and Norfolk. There is relatively little new buying for domestic account.

Reflecting foreign demands, brokers are offering $19 for No. 1 heavy melting and No. 1 bundles, and $17 for No. 2 heavy melting.

Other revisions, although not reflecting foreign demand, are advances to $13 for No. 2 bundles and $22 to $23 for low phos structurals and plate. In fact, low phos prices have shown quite a little strength for the past two weeks or so. Cast grades and stainless steel specialties are unchanged.

Boston — Based on lower revised freight rates on 40-ton minimum shipments, brokers are revising buying prices upward slightly on No. 1 heavy melting steel and bundles to around $18, shipping point. Light steel scrap and also No. 2 heavy melting cannot be loaded to the minimum rate which is roughly back to the level prior to the 15 per cent increase, effective July 20. Buying is slow, both steel and cast grades.

Cleveland — Scrap prices are unchanged but they are largely nominal with the market tone weak. Little tonnage is being taken by the mills. At the same time only relatively small lots are moving to the dealers with manufacturing operations off noticeably.

Cast grades are a little stronger as result of resumption of operations at some foundries following vacation suspensions.

Generally, brokers and dealers are not too confident of an early pickup in buying. They expect July and August to be dull months and some of them are skeptical of a pickup in September.

Lending to the uneasiness in the market is reported sale by a large railroad of 30,000 tons of scrap at the going market to a Valley mill. This road, reportedly, had been holding the scrap several months for higher prices and finally decided it had better dispose of the material in view of the continued uncertain business outlook.

Chicago—Scrap market here is devoid of spark, reflecting the influence of demand stagnancy. A falling steelmaking rate is adding to the woes of scrap generators and sellers. Last week's ingot rate of 68 per cent of capacity is 14 points below that prior to the July 4 holiday. Little better for remainder of July is expected. Cast grades are in slack demand too, because so many foundries are down for vacations.

Cincinnati—The scrap market here could not be duller. One mill has ceased buying entirely and a second is making only limited purchases. Brokers feel the quiet period will extend until August.

Buffalo—Mixed tendencies prevail in the scrap market here as steelmaking grades advanced $1 while cast prices declined the same amount. A leading mill placed orders for approximately 9000 tons at higher prices. Fresh buying from the Valley also is supporting steelmaking grades. Optimism, however, is restricted as ingot production continues to skid here.

St. Louis — Scrap transactions have slowed to a standstill. Mill activity is low and foundry operations continue spotty. Prices of all scrap

(*Please turn to page* 152)

The Gripco Lock Nut one-piece design gives a tighter more positive holding action for faster application at less cost. And for 50 years the Gripco locking feature has proven itself by an ever increasing use. All-one-piece to cut initial cost—(no inserts, outside devices or complicated features) — the extreme holding or locking action is produced by a simple, vertical thread deflection. For stress, wear or vibration, a Gripco Lock Nut will hold tighter, wear longer. Impervious to oil or water. Write for samples and full details.

GRIPCO PRODUCTS INCLUDE:
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FOR USE IN BLAST CLEANING EQUIPMENT
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PITTSBURGH CRUSHED STEEL CO., PITTSBURGH, PA.
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IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

July 21	$27.33
July 14	27.67
June Avg.	27.92
July, 1953	43.51
July, 1949	19.21

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 2 bundles	23.00-24.00
No. 1 busheling	28.00-29.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Cut structurals	29.00-30.00
Heavy turnings	26.00-27.00
Punchings & plate scrap	32.00-33.00
Electric furnace bundles	30.00-31.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Charging box cast	32.00-33.00
Heavy breakable cast	*29.00-30.00*
Unstripped motor blocks	23.00-24.00
No. 1 machinery cast	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	*31.00-32.00*
Rails, 2-ft and under	*43.00-44.00*
Rails, 18-in. and under	*45.00-46.00*
Rails, random lengths	*37.00-38.00*
Railroad specialties	*34.00-35.00*

Stainless Steel Scrap

(F.o.b. shipping point)

18-8 bundles & solids	165.00-170.00
18-8 turnings	85.00-90.00
430 bundles & solids	65.00-70.00
430 turnings	50.00-52.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	24.00-25.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	24.00-25.00
No. 2 bundles	18.00-19.00
No. 1 busheling	24.00-25.00
Machine shop turnings	12.00-13.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Low phos.	25.00-26.00
Cut structural plate 2 ft and under	31.00-32.00
Alloy free, short shovel turnings	16.50-17.50
Electric furnace bundles	25.00-26.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Charging box cast	26.50-27.50
Stove plate	33.00-34.00
Heavy breakable cast	25.50-26.50
Unstripped motor blocks	25.00-26.00
Brake shoes	29.00-30.00
Clean auto cast	42.00-43.00
No. 1 wheels	32.50-33.50
Burnt cast	27.00-28.00
Drop broken machinery	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00-31.00
R.R. malleable	40.00-41.00
Rails, 3-ft and under	42.00-43.00
Rails, 18 in. and under	44.00-45.00
Rails, random lengths	39.00-40.00
Cast steel	33.00-34.00
Railroad specialties	34.00-35.00
Uncut tires	35.00-36.00
Angles, splice bars	41.00-42.00
Rails, rerolling	42.00-43.00

Stainless Steel

(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	26.00-27.00
No. 2 bundles	19.00-20.00
Machine shop turnings	13.00-14.00
Short shovel turings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos.	29.00-30.00
Electric furnace bundles	27.00-28.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00-31.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*24.50*
No. 2 heavy melting	*22.50*
No. 1 bundles	25.00
No. 2 bundles	*19.00-20.00*
No. 1 busheling	*24.50*
Electric furnace bundles	25.00*
Machine shop turnings	14.00
Mixed borings, turnings	*16.00*
Short shovel turnings	*18.00*
Structurals & plate	*29.00-30.00*
Heavy turnings	22.00*
Couplers, springs, wheels	*32.00*
Rail crops, 2 ft & under	*42.00*

Cast Iron Grades

No. 1 cupola	35.00
Malleable	37.00
Heavy breakable cast	35.50
Unstripped motor blocks	nom.
Drop broken machinery	41.00

*Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*19.00*
No. 2 heavy melting	*17.00*
No. 1 bundles	*19.00*
No. 2 bundles	*13.00*
Machine shop turnings	5.00-6.00
Mixed borings, short turnings	8.00-9.00
Low phos. (structural & plate)	*22.00-23.00*
Short shovel turnings	9.00-10.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstriped motor blocks	19.00-20.00*

Stainless Steel

18-8 sheets, clips, solids	170.00-175.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	40.00
410 sheets, clips, solids	30.00

*Nominal.

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*17.50-18.00*
No. 2 heavy melting	*14.25-14.50*
No. 1 bundles	*17.50-18.00*
No. 2 bundles	*12.00-13.00*
Machine shop turnings	3.00-3.50
Mixed borings, turnings	*6.50-7.00*
Short shovel turnings	*8.50-9.00*
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

CINCINNATI

(Brokers' buying prices; f.o.b shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	25.00-26.00
No. 2 bundles	19.00-20.00
No. 1 busheling	25.00-26.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	14.00-15.00
Cast iron borings	14.00-15.00
Low phos. 18-in.	32.00-33.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	35.00
Charging box cast	36.00
Drop broken machinery	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	29.00-30.00
Rails, 18-in. and under	43.00-44.00
Rails, random lengths	36.00-37.00

CHICAGO

No. 1 heavy melting	*28.00-30.00*
No. 2 heavy melting	26.00-27.00
No. 1 factory bundles	31.00-32.00
No. 1 dealer bundles	28.00-29.00
No. 2 bundles	22.00-23.00
No. 1 busheling	*28.00-30.00*
Machine shop turnings	12.00-13.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	14.00-15.00
Cast iron borings	14.00-15.00
Cut structurals, 3-ft	32.00-33.00
Punchings & plate scrap	32.00-33.00
Electric furnace bundles	*31.00-32.00*

Cast Iron Grades

No. 1 cupola	35.00-36.00
Stove plate	*28.00-29.00*
Unstripped motor blocks	24.00-25.00
Clean auto cast	37.00-38.00
Drop broken machinery	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
R.R. malleable	40.00-42.00
Rails, 2-ft. and under	43.00-44.00
Rails, 18-in. and under	44.00-45.00
Angles, splice bars	37.00-38.00
Rails, rerolling	43.00-44.00

Stainless Steel Scrap

18-8 clips & solids	130.00-140.00
18-8 turnings	60.00
430 clips & solids	40.00
430 turnings	*20.00-25.00*

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	19.00
No. 2 heavy melting	17.00
No. 1 bundles	20.00
No. 2 bundles	15.00
No. 1 busheling	20.00
Machine shop turnings	9.00
Mixed borings, turnings	9.00
Short shovel turnings	9.50
Punchings & plate scrap	23.50

Cast Iron Grades

No. 1 cupola	33.00
Charging box cast	27.00
Stove plate	29.00
Heavy breakable	24.00
Unstripped motor blocks	18.00
Clean auto cast	37.00
Malleable	28.00

BUFFALO

No. 1 heavy melting	*26.00-27.00*
No. 2 heavy melting	*22.00-23.00*
No. 1 bundles	*26.00-27.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*26.00-27.00*
Machine shop turnings	*13.00-14.00*
Mixed borings, turnings	*16.50-17.00*
Short shovel turnings	*17.50-18.00*
Cast iron borings	*16.50-17.00*
Low phos.	*28.00-28.50*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	41.00-42.00

Railroad Scrap

Rails, random lengths	33.00-34.00
Rails, 3-ft and under	40.00-41.00
Railroad specialties	34.50-35.50

BIRMINGHAM

No. 1 heavy melting	23.50-24.50
No. 2 heavy melting	22.00-23.00
No. 1 bundles	18.00-19.00
No. 2 bundles	16.00-17.00
Cast iron borings	13.00-14.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	26.00-27.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	43.50-44.50
Stove plate	40.50-41.50
Bar crops and plate	29.00-30.00
Structural plate 2 ft.	29.00-30.00
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	26.00-27.00
Rails, 18-in. and under	40.00-41.00
Rails, rerolling	39.00-40.00
Angles, splice bars	36.00-37.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*25.50*
No. 2 heavy melting	*23.50*
No. 1 bundles	*25.50*
No. 2 bundles	*19.25*
Machine shop turnings	*11.00*
Short shovel turnings	*12.00*

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	29.00
Heavy breakable cast	29.00
Unstripped motor blocks	29.00
Brake shoes	30.00
Clean auto cast	39.00
Stove plate	*31.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*29.50*
Rails, 18-in. and under	*40.00*
Rails, random lengths	*37.00*
Rails, rerolling	*43.00*
Uncut tires	32.50
Angles, splice bars	*32.00*

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	25.00
No. 2 heavy melting	21.00
No. 1 bundles	21.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turnings	11.50
Mixed borings, turnings	11.50
Short shovel turnings	11.50
Electric furnace, No. 1	32.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	30.00-35.00
Heavy breakable cast	25.00
Unstripped motor blocks	23.00
No. 1 wheels	21.00
Stove plate(f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap

(Delivered consumer plant)

Rails, random lengths	30.00-34.00

SAN FRANCISCO

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 1 busheling	20.00
Machine shop turnings	5.00
Mixed borings, turnings	5.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	42.00-45.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	29.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	43.00

LOS ANGELES

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	20.00
No. 2 bundles	16.00
Machine shop turnings	6.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	38.00-42.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	$22.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Rails, remelting	32.00
Busheling, new factory: Prepared	20.00
Unprepared	16.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

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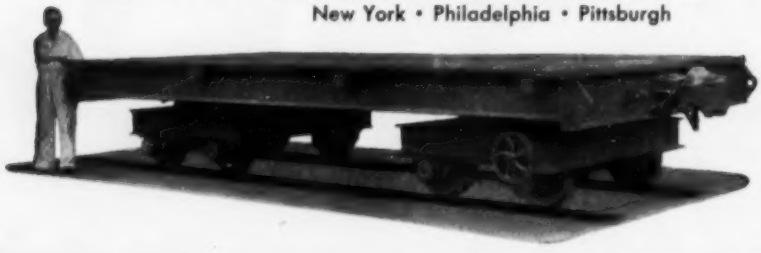

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(*Concluded from page* 149)

grades are on the soft side, although a poor supply of rerolling rails plus continued demand holds up that sector. Dealers' yard receipts are poor, especially from rural sources. Mill scrap piles are low but good in relation to operations. By the same yardstick, foundry stocks are high.

San Francisco—Cast iron grades of scrap continue in strong demand in this area. Steelmaking grades, however, move slowly.

Los Angeles—With demand in the doldrums, collections of steelmaking scrap have fallen off 35 per cent. Auto wreckers, representing the area's largest scrap source, have slowed activity. Despite the dull market, prices are holding.

Scrap Futures Trading Set

Chicago — Trading in scrap steel futures will be opened on the Chicago Mercantile Exchange Sept. 7. The Exchange is publishing a booklet describing the contracts and giving statistical details for the scrap industry.

As approved by the board of governors new contracts will call for a unit of 40 gross tons of No. 1 heavy melting steel. No. 2 heavy melting will also be deliverable as a substitute at a discount of $5 per ton. Variation in quantity not in excess of 10 per cent over or under will be permitted at time of delivery with payment made on the basis of exact quantity delivered. Official exchange inspection of all details will be final.

Minimum price fluctuations on contracts will be 12.5 cents a ton or $5 a contract and commission rates nonmembers of the exchange must pay will be $18 a contract for a round-turn transaction. Delivery months of contracts will be January and March 1955 on initial trades. Additional months of delivery later in 1955 may be added after discussion by the exchange board.

Exchange officials are confident contracts will be well accepted by the trade as soon as details and technique of futures trading are well understood.

Pig Iron . . .

Pig Iron Prices, Page 134

New York—Blast furnace production in June totaled 4,724,150 net tons, reports the American Iron & Steel Institute. This compares with output of 6,372,531 tons in June a year ago.

Of total output during the month

4,683,629 tons were pig iron and 40,521 tons ferromanganese and spiegeleisen. In June, 1953, 6,297,559 tons of pig iron and 74,972 tons of ferroalloys were produced.

Cumulative production in the first six months this year was 29,191,682 net tons of which 28,899,224 tons were pig iron and 292,458 tons ferroalloys. This compares with first half 1953 output of 38,313,549 tons, of which 37,894,903 tons were pig iron and 418,646 tons ferromanganese and spiegeleisen.

New York—Pig iron is moving in slightly larger volume, but business is still dull. Foundry operations are lagging badly, with casting demand light and suspensions for mass vacations still noted. No important upswing is expected over the next several weeks.

Republic Steel Corp.'s furnace at Troy, N. Y., has suspended operations 60 days because of the lull in business.

Boston—Producers of merchant pig iron, with the closing of the Troy, N. Y., furnace for an estimated 60 days, have further reduced output to nearer the slow demand. Most have substantial and well balanced reserves. Mystic furnace is operating on low draft and contract consumers are not taking in tonnage due them. July shipments will be light, also August. But users of foundry and malleable are without much inventory. Even a mild pickup in demand for castings this fall would soon be reflected in more iron shipment releases.

Buffalo—With two more blast furnaces withdrawn from production because of the general decline in iron buying, the district pig iron rate slipped to 50 per cent of capacity. Vacations and falling off in demand, with the exception of automotive buying, are the principal factors for the slump.

Philadelphia—Pig iron demand is slow with no signs of early substantial gain. Some furnace capacity, down originally for repairs, could be back in operation now if demand warranted. Not only is there little buying from domestic producers, but from foreign sellers whose prices are well below the American market.

Cleveland — Vacation suspensions and reduced summer operations of foundries in this area are reflected in further cutback in merchant pig iron production. Interlake Iron Corp., leading merchant interest, has placed its Toledo, O. blast furnace plant on a 4-day week. It had been on a 5-day schedule, though most of this year the plant has been en-

CLASSIFIED

Help Wanted

METALLURGICAL ENGINEER

Man over 35 needed with technical and executive experience to administer laboratory and conduct technical service to customers and sales and production department of tube mill producing stainless and high alloy welded tubing. THE CARPENTER STEEL COMPANY, ALLOY TUBE DIVISION, Union, New Jersey.

QUALIFIED BLAST FURNACE SUPERINTENDENT or Assistant on single stack plant. Give experience, education and salary expected. Write in detail. Reply Box 978, STEEL, Penton Building, Cleveland 13, Ohio.

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Small, financially strong, Ohio steel plate and alloy fabricating plant with long record of profitable operation has opening for man of highest type. Permanent position with unlimited opportunity for growth. Must be thoroughly experienced in code welding practice, maintenance, costs and able to organize production and get results. Enclose photograph and give full experience with references and salary bracket expected. Only fully qualified need apply. Reply Box 997, STEEL, Penton Building, Cleveland 13, Ohio.

Positions Wanted

GENERAL or PLANT MANAGER—20 years' experience in fabrication of steel for buildings, bridges, and special structures. Experience includes, sales, engineering, purchasing as well as supervision of same plus supervision of production and field erection. Reg. Prof. Engr. Age 39. Desire position with progressive company in steel fabrication industry. Reply Box 995, STEEL, Penton Building, Cleveland 13, Ohio.

PLANT MANAGER—M.I.T. Engineering Graduate with Proven Record in Plant Supervision and Control. Qualified as Production Manager or Chief Industrial Engineer. Reply Box 992, STEEL, Penton Building, Cleveland 13, Ohio.

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WESTERN UNION-TFI BELL SYSTEM TELETYPEWRITER-CI-448-U TELEPHONE WOodburn 1280

gaged at only 65 per cent of capacity. One of the plant's two blast furnaces was closed down a week ago.

Some improvement in demand is expected next month but sellers do not anticipate any buying rush with melters assured of prompt furnace shipments, consequently being under no pressure to increase inventories.

Chicago—Pig iron shipments are at the lowest point of the year as result of foundry closings this month for vacations. Demand is slack too. Wisconsin Steel completed two weeks banking of its South Chicago No. 1 blast furnace. Consequently, 31 of the district's 43 stacks are operating.

St. Louis—Pig iron sales are listless. Completion of a relining job on one of Granite City Steel's two stacks is due this month but its lighting may be deferred. Foundry iron stocks laid on the ground preparatory to the relining still are ample for demand.

Develops Limestone Property

Detroit—"Port Dolomite," a new-name on the Great Lakes, will become the shipping point next spring of upwards of 3 million tons annually of high-grade dolomite limestone. United States Steel Corp.'s Michigan Limestone Division, this city, expects to open its new dolomite quarries and to complete construction of processing plants on the Upper Peninsula of Michigan in late fall.

Construction crews, which began work in April, 1953, are pushing the railroad line from the quarries, which lie five miles inland near Cedarville, Mich., to the new port. A primary crusher is being erected on the floor of the quarry which is 46 ft below the surface.

Plans call for the stone to be hauled over the rail line from this crusher to the Port Dolomite area where a secondary and tertiary crusher and screening plant of about 1800 tons per hour capacity will process the stone into eight grades of stone, ranging from 3 x 5 flux stone to rice size just over 1/16-in.

Chemical composition of the limestone is about 45 per cent magnesium carbonate and 55 per cent calcium carbonate with only about ½ per cent of impurities. It is exceptionally low in silica, phosphorus and sulphur content. It has a magnesia content in excess of 21 per cent. These qualities lend the stone well not only for metallurgical and chemical usage, but make it desirable for many other uses to which this type of stone is put in industry.

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Heads are drilled and tapped in perfect alignment, so that end fittings pull evenly.

Threading is American National Course series, class 2 fit, for easy assembly.

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Shut-eye's safer with new shut-off control

Ahhh, sleep... it's wonderful! And now because of G. E.'s new SLEEP-GUARD Wiring System—made of two spiral wires separated by a nylon sheath—sleep's safer, too. If the heating wire becomes too warm, the nylon sheath—along with the heater and signal wire—automatically turns off your blanket. Both wires are made of Hitenso*, a cadmium bronze which provides just the right electrical and mechanical properties. We process almost 100 copper alloys into wire in a wide variety of sizes and shapes, tempers and finishes.

A million at one clip for Betty

Anyone who's ever settled down before a TV set needs no introduction to charming Betty Furness of Westinghouse Studio One fame. Betty's currently offering her vast viewing audience this handy Westinghouse Kitchen Thermometer Set at a bargain price. And Westinghouse expects an overwhelming response. That's why they had Chaney Mfg. Co., Springfield, Ohio, make a million of these sets at one clip. And speaking of clips, those attached to these thermometers are made of coiled brass strip in the most economical alloy, gage and temper.

Vive le valve plug!

The Aluminum and Brass Co., Lockport, N. Y., calls this valve plug—which employs a nylon insert and operates under pressures up to 3,000 psi—the "heart" of their Sherwood Oxygen Valve. We're mighty proud about their enthusiasm, since the plug is made of one of our Copper-Silicon Alloys. Everdur*-1015 was chosen because roll-threading not only frees it from burrs but also work-hardens its surface, making it less likely to wear, gall or "freeze." Everdur-1015's cold-working properties also allow it to be rolled *over* the nylon insert. A tight "cap" results.

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Our Technical Department's wide range of experience covers virtually the entire field of copper and copper-alloy applications in industry. If you have a problem of metal selection, we are at your service. *The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.*

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Studies in Centralized Lubrication
No. 152

ONE bearing missed by grease gun or oil can and the finest press can be out of production. To avoid this possibility, the builder of these newly-designed Cleveland power presses in a famous appliance maker's mid-western manufacturing plant installed modern lubrication systems—Farval!

Farval Eliminates Lubrication Downtime

Farval is the foolproof Dualine system of centralized lubrication that hydraulically delivers a measured amount of clean lubricant at regular intervals to all bearings, *never missing any.* In this way, downtime due to hit-and-miss lubrication is completely eliminated. To lubricate an average press with Farval takes only one minute *while the press is in operation!* Compare this to the 15-20 minutes it takes each time to lubricate by hand.

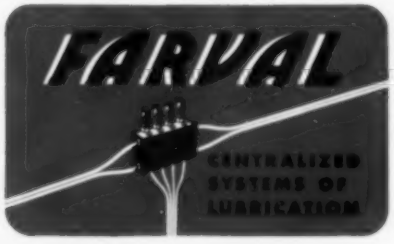
Saves up to 75% Lubricant

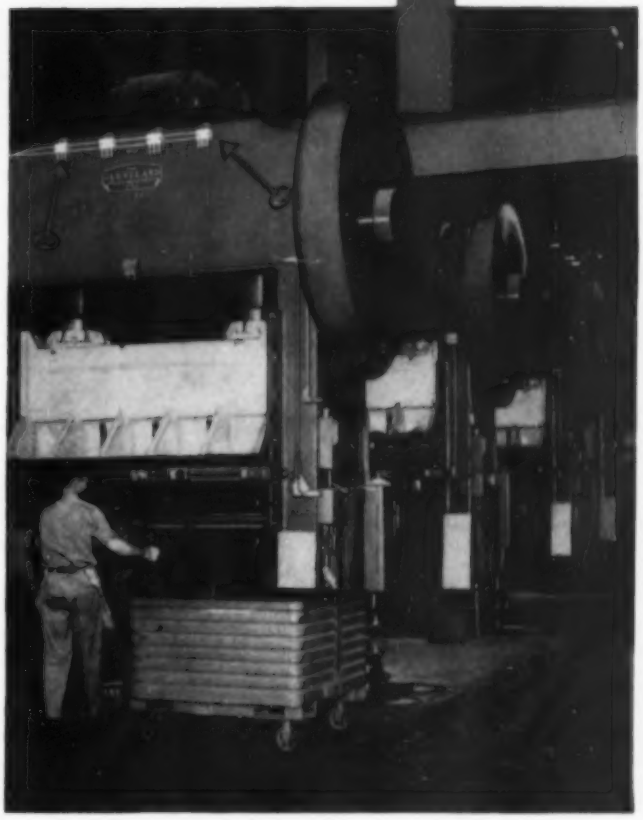
The moment you install Farval, you start to save up to 75% of former lubricant consumption. Not only that, but you also get rid of splashes of dangerously slippery grease or oil because Farval is a safe, completely enclosed system.

Press builders prefer Farval because the Farval Dualine valve is simple and sure, with wide ports engineered to deliver the *exact* amount of lubricant required. There are no uncertain springs, ball-checks or pinhole ports to cause trouble. With only two moving parts, the Farval measuring valve is trouble-free! Indicators at every bearing show *positive proof* that each valve has functioned.

Why not give your presses the life insurance they need? Install Farval! Write for Bulletin 26. The Farval Corporation, 3270 E. 80th St., Cleveland 4, O.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



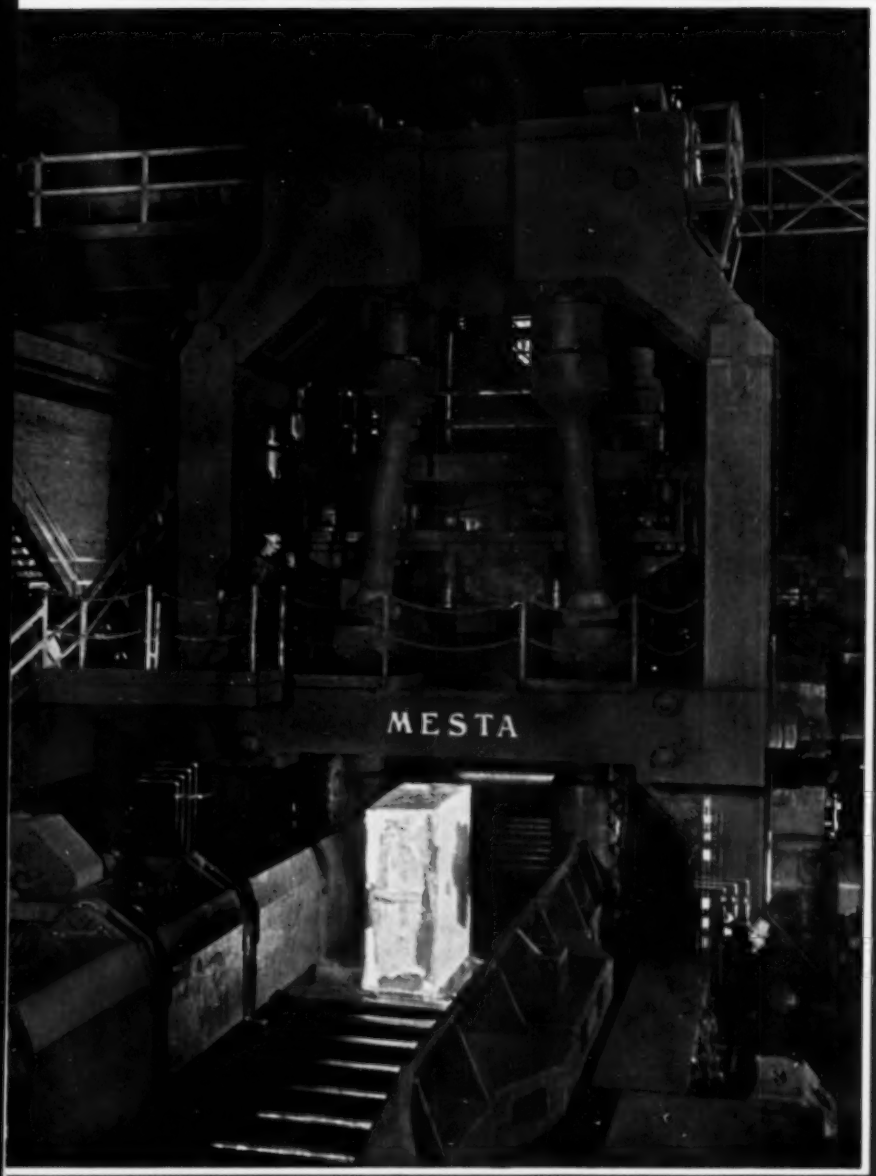


KEYS TO ADEQUATE LUBRICATION — Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.

Battery of 8 presses equipped with Farval in the shop of a large kitchen-range manufacturer. Photo courtesy of The Cleveland Punch & Shear Works Co.

Designed and Built by

MESTA



Rolling 20 ton ingots into slabs on a Mesta 45"x 90" Universal Reversing Slabbing Mill

SLABBING MILL

for

GREAT LAKES STEEL CORPORATION

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Designers and Builders of Complete Steel Plants

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